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KIPS SATs UNIT WISE

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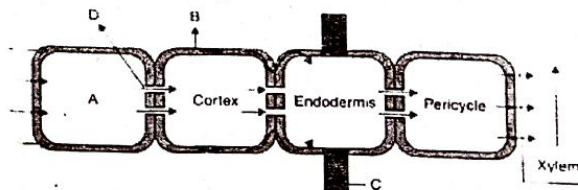
- This Pre-Prep Test is designed to help you to pinpoint the weak areas in your background. Set aside 1 hour to take this test. Check your answers with those at the end of the test. Then evaluate yourself.

PRE-PREP TEST »

- Q.1 Cellular digestion is associated with which organelle:**
 A. Mitochondria
 B. Plastids
 C. Golgi bodies
 D. Lysosomes
- Q.2 Which of the following cell have no mitochondria?**
 A. Viruses
 B. RBCs
 C. Nerve cells
 D. Muscle cell
- Q.3 Fat storing granules are:**
 A. Elaioplast
 B. Amyloplast
 C. Aleuoplasts
 D. Proteinoplast
- Q.4 Name a self-replicating organelle:**
 A. Mitochondria
 B. Peroxisomes
 C. Phagosomes
 D. Golgi bodies
- Q.5 How do membranes function as a locus of biochemical reactions?**
 A. Membranes lipids catalyze important cellular reactions
 B. Membranes increase the activation energy for catalysis
 C. Membrane hold enzymes of sequential reactions nearby
 D. Membranes separate the reactants from the products of enzymatic reactions
- Q.6 These are the most abundant components of a cell membrane:**
 A. Lipids
 B. Carbohydrates
 C. Protein
 D. Glycolipids
- Q.7 Variety among amino acids is produced due to:**
 A. NH_2 group
 B. R group
 C. COOH group
 D. Functional group
- Q.8 The primary structure of proteins is determined by:**
 A. Number of polypeptide chains involved
 B. Amino acid sequence
 C. Bending of polypeptide chains
 D. Coiling of polypeptide chains
- Q.9 The one which is not a globular protein:**
 A. Anti Rh-antibody
 B. Myosin tail
 C. Enzyme
 D. Haemoglobin
- Q.10 Which amino acid has no asymmetrical carbon atom?**
 A. Proline
 B. Glycine
 C. Histidine
 D. Threonine
- Q.11 Hydrolysis of which of the following would yield fructose in addition to glucose?**
 A. Sucrose
 B. Lactose
 C. Maltose
 D. Cellulose
- Q.12 For enzymes cyanides act as:**
 A. Substrates
 B. Cofactors
 C. Prosthetic groups
 D. Inhibitors
- Q.13 An enzyme that converts a dipeptide into individual amino acids is an example of:**
 A. Decarboxylase
 B. Oxidoreductase
 C. Hydrolase
 D. Transferase

- Q.14 Enzyme inhibition caused by a product of the enzyme-catalyzed reaction is:
 A. Feedback inhibition
 B. Metabolic antagonism
 C. Competitive inhibition
 D. Non-competitive inhibition
- Q.15 The phase of cellular respiration during which coenzyme-Q is reduced by NADH is:
 A. Glycolysis
 B. Krebs cycle
 C. Pyruvic acid oxidation
 D. Electron transport chain
- Q.16 Electron donor to PS-1 is:
 A. Cytochrome 'f'
 B. Plastocyanin
 C. Cytochrome 'b₆'
 D. Ferredoxin
- Q.17 Cisternae is made up of:
 A. Glycoproteins
 B. Nucleoproteins
 C. Glycolipids
 D. Nucleoproteins
- Q.18 Net production of ATP during glycolysis is:
 A. 2 ATP
 B. 36 ATP
 C. 4 ATP
 D. 38 ATP
- Q.19 The end product of the preparatory phase of glycolysis is:
 A. Glucose
 B. ATP
 C. Pyruvate
 D. G₃P
- Q.20 Protein coats of viruses are synthesized in:
 A. Lytic cycle
 B. Temperate cycle
 C. Lysogenic cycle
 D. Nucleus
- Q.21 Host biosynthetic machinery forms all components of phages under phage genomic information except:
 A. DNAs
 B. Envelope of phages
 C. Tail proteins
 D. Capsid proteins
- Q.22 The mode of reproduction in viruses is:
 A. Conjugation
 B. Binary fission
 C. Replication
 D. Transformation
- Q.23 Which of these is incorrect about HIV?
 A. Envelope is lipoprotein in nature
 B. Cone-shaped capsid
 C. Contains one molecule of RNA
 D. Two molecules of reverse transcriptase
- Q.24 *Enterobius vermicularis* is usually not associated with:
 A. Inflammation of appendix
 B. Inflammation of colon
 C. Itching of anus
 D. Blood clotting
- Q.25 Pick out different considering habitat:
 A. Liver fluke
 B. Hookworm
 C. Pinworm
 D. *Ascaris*
- Q.26 Common housefly may be a cause of:
 A. Polio
 B. Hepatitis
 C. Tuberculosis
 D. Malaria
- Q.27 Which one of the following is not an example of endoparasite?
 A. Leech
 B. Hookworm
 C. Liver fluke
 D. Pinworm
- Q.28 There are _____ principle sites of digestion in the digestive system of man:
 A. 2
 B. 4
 C. 3
 D. 5

- Q.29 Oral cavity is bounded by all except:
 A. Cheeks
 B. Palate
 C. Teeth
 D. Salivary glands
- Q.30 The pyloric sphincter is present between the stomach and:
 A. Esophagus
 B. Colon
 C. Duodenum
 D. Ileum
- Q.31 A muscular sphincter that regulates the opening of the esophagus into the stomach is:
 A. Pyloric sphincter
 B. Sphincter of Oddi
 C. Esophageal sphincter
 D. Cervical sphincter
- Q.32 Select the incorrect match
Gland
 A. Cheeks -
 B. Lower jaw -
 C. Below tongue -
 D. Pineal gland -
Position
 Parotid
 Sub-maxillary/sub-mandibular
 Sub-lingual
 Spinal Cord
- Q.33 Chylomicrons are concerned with the:
 A. Digestion of fats
 B. Digestion of protein
 C. Absorption of proteins
 D. Absorption of fats
- Q.34 Which one has the smallest diameter?
 A. Right bronchus
 B. Secondary bronchiole
 C. Left bronchus
 D. Respiratory bronchiole
- Q.35 The largest quantity of air that can be expired after a maximum inspiratory effort is:
 A. Residual volume
 B. Vital capacity
 C. Tidal volume
 D. Total lung volume
- Q.36 Oxygen binding to hemoglobin is:
 A. Directly proportional to CO₂ concentration
 B. Inversely proportional to CO₂ concentration
 C. Directly proportional to CO concentration
 D. Independent of CO concentration
- Q.37 Identify A to D in the given figure given below:



- A. A-Plasma membrane, B-Plasmodesmata, C-Epidermal cell, D-Casparian strip
 B. A-Casparian strip, B-Epidermal cell, C-Plasmodesmata, D-Plasma membrane
 C. A-Plasmodesmata, B-Epidermal cell, C-Casparian strip, D-Plasma membrane
 D. A-Epidermal cell, B-Plasma membrane, C-Casparian strip D-Plasmodesmata
- Q.38 Basophils secrete:
 A. Histamine
 B. Heparin
 C. Serotonin
 D. All A, B, C
- Q.39 How many papillary muscles are present in left ventricle?
 A. 1
 B. 3
 C. 2
 D.

- Q.40 Which of the following are triploblastic and acoelomate?
A. Sponges
C. Annelida
B. Platyhelminthes
D. Aschelminthes
- Q.41 *Drosera intermedia* is generally known as:
A. Sun dew
C. Morels
B. Pitcher plant
D. Venus fly trap
- Q.42 Which of these makes the third line of defense?
A. Neutrophils
C. Skin
B. Macrophages
D. Lymphocytes
- Q.43 Antibodies consist of:
A. One chain
C. Three chains
B. Two chains
D. Four chains
- Q.44 Senile RBCs break down occur mainly in:
A. Bone marrow
C. Lymph nodes
B. Liver
D. Spleen
- Q.45 All of the following veins carry deoxygenated blood except:
A. Superior vena cava
C. Inferior vena cava
B. Hepatic vein
D. Pulmonary vein
- Q.46 Joint present between the proximal end of radius and ulna with humerus is:
A. Pivot
C. Ball and socket joint
B. Hinge joint
D. Synovial joint
- Q.47 Elastin is a protein that can be found in:
A. Bones
C. Tendons
B. Ligaments
D. Capillaries
- Q.48 The one which causes contraction of the wall of the uterus during and after birth:
A. ADH
C. MSH
B. Oxytocin
D. Progesterone
- Q.49 The spiny look of neurons is due to their:
A. Myelin sheath
C. Dendron
B. Axon
D. Dendrites
- Q.50 All of the following are important functions of neuroglia in CNS except:
A. Protection of neurons
C. Neuronal division
B. Speed up impulse conduction
D. Nutrition of neurons
- Q.51 Uterus gains maximum thickness during:
A. Secretory phase
C. Menstrual phase
B. Proliferative phase
D. Ovulatory phase
- Q.52 Oogenesis in human females starts:
A. At puberty
C. Before birth
B. Before puberty
D. After puberty
- Q.53 Haemophilia can be the result of:
A. Reduction of blood clotting factors
C. Complete absence of blood clotting factors
B. Malfunctioning of blood clotting factors
D. All A, B, C
- Q.54 Multiple alleles are the alleles that are always:
A. More than 1
C. More than 2
B. More than 3
D. More than 4

- Q.55 Albinism is a _____ trait:
A. Autosomal dominant
C. Autosomal recessive
B. Sex-linked dominant
D. Sex-linked recessive
- Q.56 Which of the following traits pass in zig-zag fashion from parents to offspring?
A. X-linked traits
C. Sex influenced traits
B. Y-linked traits
D. Sex limited traits
- Q.57 Which of the following blood group in humans is an example of co-dominance?
A. A
C. AB
B. B
D. O
- Q.58 Gene for all of the followings is linked with autosomal chromosomes except:
A. Sickle cell anemia
C. Leukemia
B. Gout
D. Hemophilia C
- Q.59 The process that has transformed life on earth from its earliest forms to vast diversity is:
A. Mutation
C. Migration
B. Evolution
D. Genetic drift
- Q.60 The one which is present in all aerobic species:
A. Cytochrome a
C. Cytochrome c
B. Cytochrome a₃
D. Cytochrome b
- Q.61 The structure which has been formed or modified from gill pouches in humans is:
A. Gills
C. Eustachian tube
B. Middle ear
D. Lungs
- Q.62 Which of the following part of the neuron is covered by fatty sheath?
A. Axon
C. Dendrite
B. Cyton
D. Node of Ranvier
- Q.63 The correct sequence of meninges from inner to the outer side is:
A. Arachnoid membrane → dura mater → pia mater
B. Dura mater → Arachnoid membrane → pia mater
C. Pia mater → Arachnoid membrane → Dura mater
D. Dura mater → pia mater → Arachnoid membrane
- Q.64 Which of the following hormone stimulates the synthesis and secretion of steroid hormones called glucocorticoids from the adrenal cortex?
A. TSH
C. ACTH
B. LH
D. FSH
- Q.65 Aldosterone causes all except:
A. Reabsorption of electrolyte and water from the renal tubule
B. Excretion of PO_4^{3-} ion
C. Excretion of K^+
D. Absorption of K^+
- Q.66 In males, the essential hormone for secondary sexual characteristics is:
A. Relaxin
C. Testosterone
B. Estrogen
D. Progesterone
- Q.67 The Graafian follicle is maintained by:
A. Estrogen
C. LH
B. Prolactin
D. FSH
- Q.68 Cartilage is a form of:
A. Cardiac tissue
C. Epithelial tissue
B. Connective tissue
D. Nervous tissue

ANSWER KEY

1	D	11	A	21	B	31	C	41	A	51	A	61	C
2	B	12	D	22	C	32	D	42	D	52	C	62	A
3	A	13	B	23	C	33	D	43	D	53	D	63	C
4	A	14	A	24	D	34	D	44	D	54	C	64	C
5	C	15	D	25	A	35	B	45	D	55	C	65	D
6	C	16	B	26	B	36	B	46	B	56	A	66	C
7	B	17	B	27	A	37	D	47	B	57	C	67	D
8	B	18	A	28	C	38	D	48	B	58	B	68	B
9	B	19	D	29	D	39	C	49	D	59	B		
10	B	20	A	30	C	40	B	50	C	60	C		

EXPLANATORY NOTES

- Lysosomes** are sac-like organelles that have digestive enzymes in them.

Mitochondria involve in aerobic respiration.

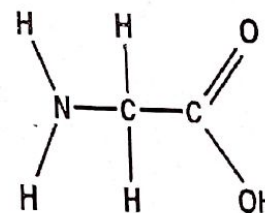
Golgi bodies are involved in the packing, processing, modification, and transport of materials.

Plastids are plants organelles that are involved in the synthesis of sugar, pollination and storage of organic materials.
- RBCs have no mitochondria.

Viruses are not considered as cell.

Nerve and muscle cells need more energy for activities, so mitochondria provide that energy.
- Elaoplast are fat storing amyloplast starch storing and proteinoplast are protein storing.
- Mitochondria and chloroplast are self-replicating organelles because both have their own DNA, due to which they can synthesize some of their proteins.
- Different enzymes are attached with membranes.
- Followings are components in the cell membrane

 - Proteins are 60-80%
 - Lipids are 20-40%
 - Carbohydrates are in traces
- Each of the 20 amino acids has a specific side chain, known as an R group, that is also attached to the α carbon. The R groups have a variety of shapes, sizes, charges, and reactivities. This allows amino acids to be grouped according to the chemical properties of their side chains.
- The linear sequence of amino acids within a protein is considered the primary structure of the protein. Proteins are built from a set of only twenty amino acids, each of which has a unique side chain. The side chains of amino acids have different chemistries. The largest group of amino acids have non-polar side chains.
- Antibodies, enzymes and haemoglobin are globular proteins perform functions.



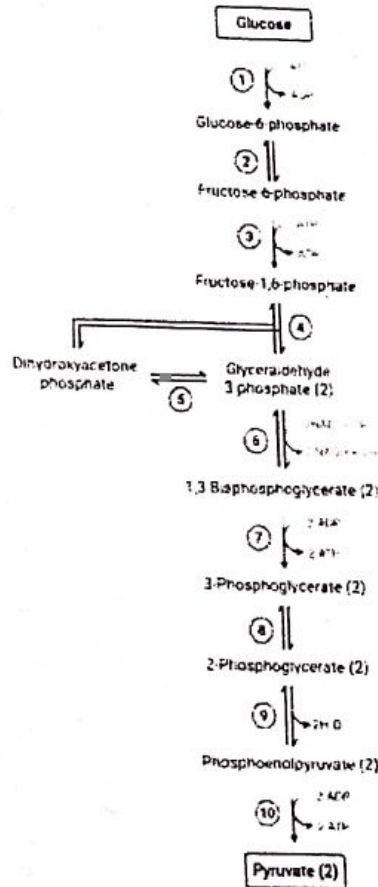
- Above diagram shows that glycine don't has asymmetrical carbons
- Hydrolysis of:

 - Lactose gives galactose and glucose.
 - Maltose gives two glucose monomers.
 - Cellulose gives glucose monomers.
 - Inhibitors are the substances that block enzyme action temporarily or permanently. Prostheti group is a type of cofactor.
 - Oxidoreductase** is an enzyme that catalyzes the transfer of electrons from one molecul

Decarboxylases, are carbon-carbon lyases that add or remove a carboxyl group from organ compounds.

19. End product of Preparatory phase of glycolysis:

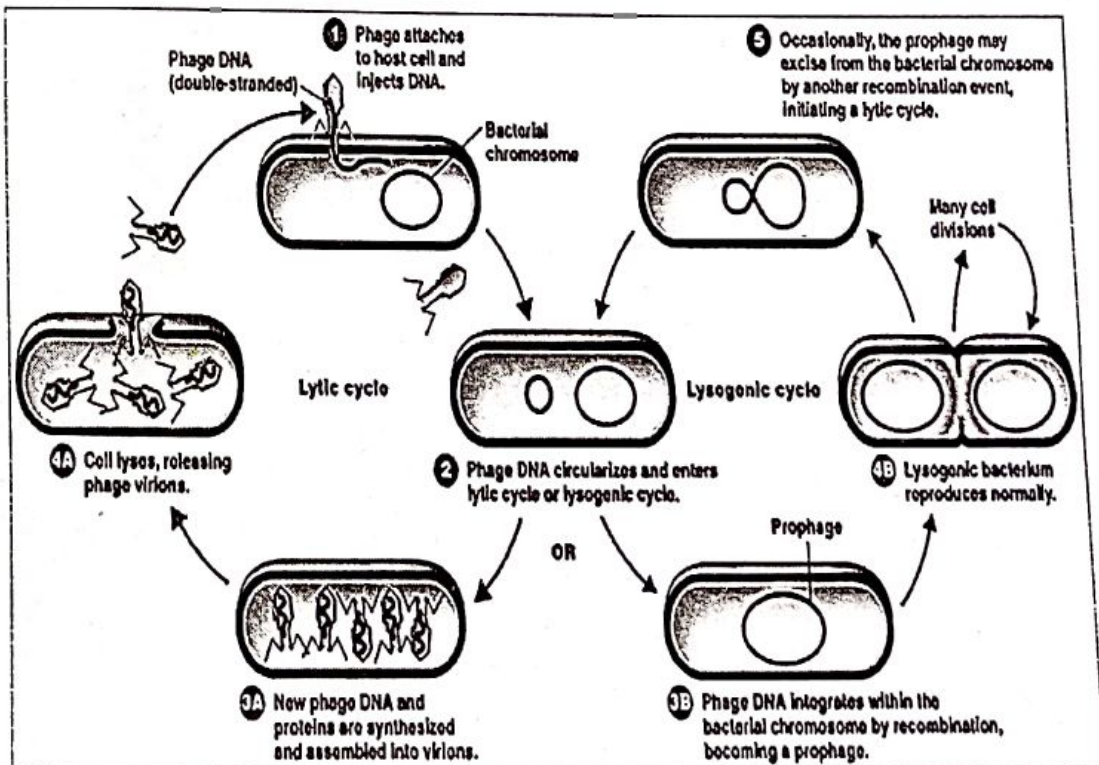
Glycolysis and Glycolytic Enzymes

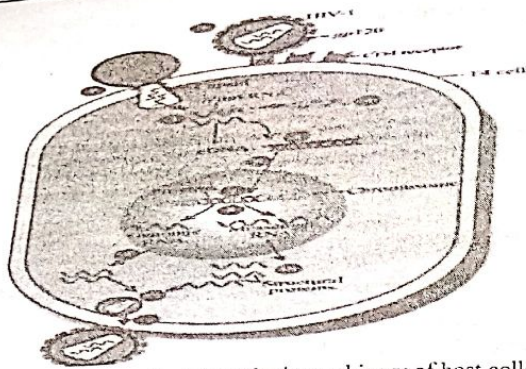


ENZYMES	
①	Hexokinase
②	Phosphoglucose isomerase
③	Phosphofruktokinase 1
④	Aldolase
⑤	Triosephosphate isomerase
⑥	Glyceraldehyde 3 phosphate dehydrogenase
⑦	Phosphoglycerate kinase
⑧	Phosphoglyceromutase
⑨	Enolase
⑩	Pyruvate kinase

PRODUCTS	
2 ATP	2 Pyruvate
2 NADH	

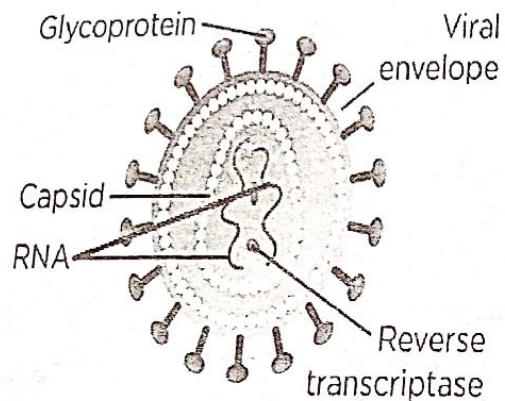
20. Life cycle of bacteriophage:



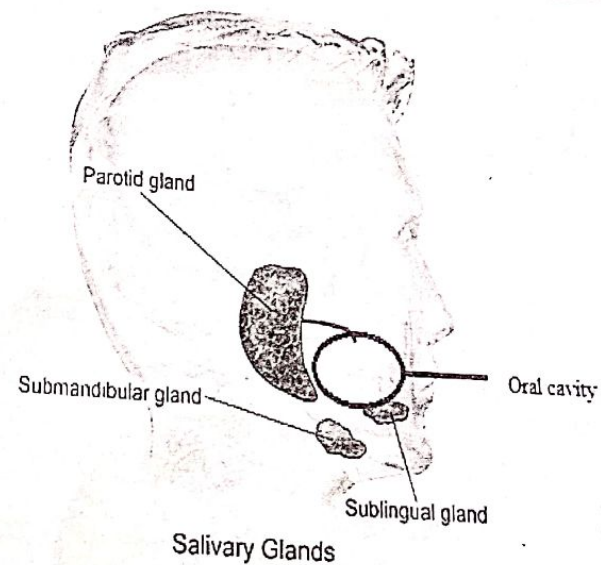


22. As viral DNA after penetration occupy the biosynthetic machinery of host cells. Viral cDNA is incorporated in host DNA and form many copies by replication

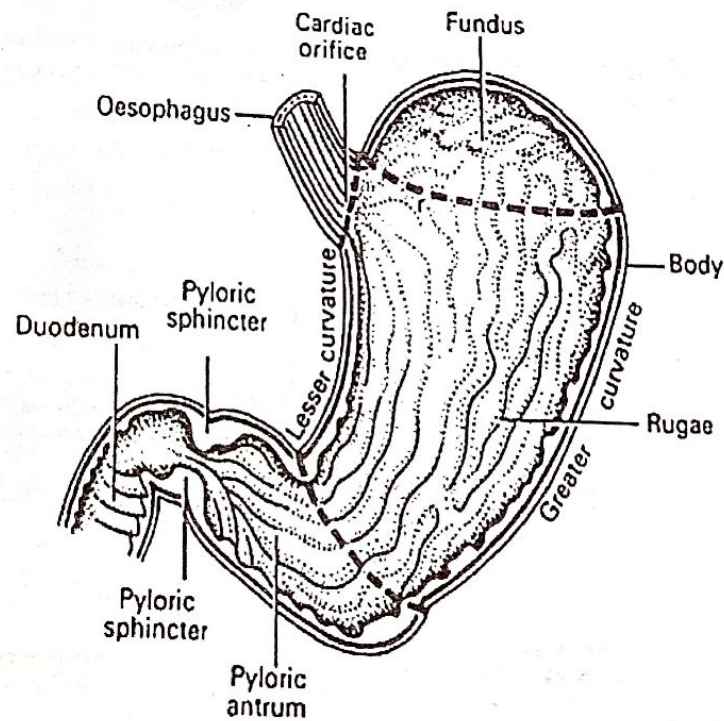
23.



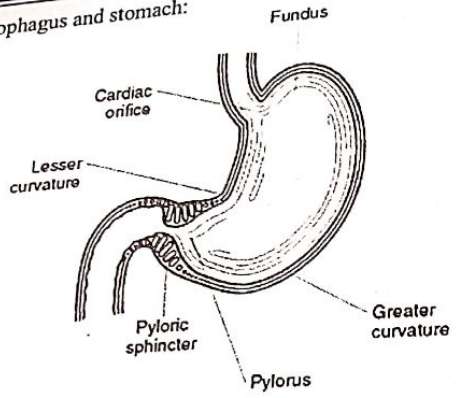
24. Liver fluke occurs in liver while other three Hookworm, *Ascaris* and Pinworm are found in intestine.
25. Pin worm, Hook worm and *Ascaris* are parasites of gut, while Liver fluke is parasite of bile duct of liver an accessory digestive gland.
26. A fly may act as a mechanical vector of diseases such as Hepatitis A, which means the fly carries the infective organism on its feet or mouth parts and contaminates food or water which a person then consumes. Leech is example of ectoparasite.
27. Liver fluke occurs in liver while other three Hookworm, *Ascaris* and Pinworm are found in intestine.
28. Digestive process is occurred in following sites:
- Oral cavity
 - Stomach
 - Small intestine



30.



31. Sphincter between oesophagus and stomach:

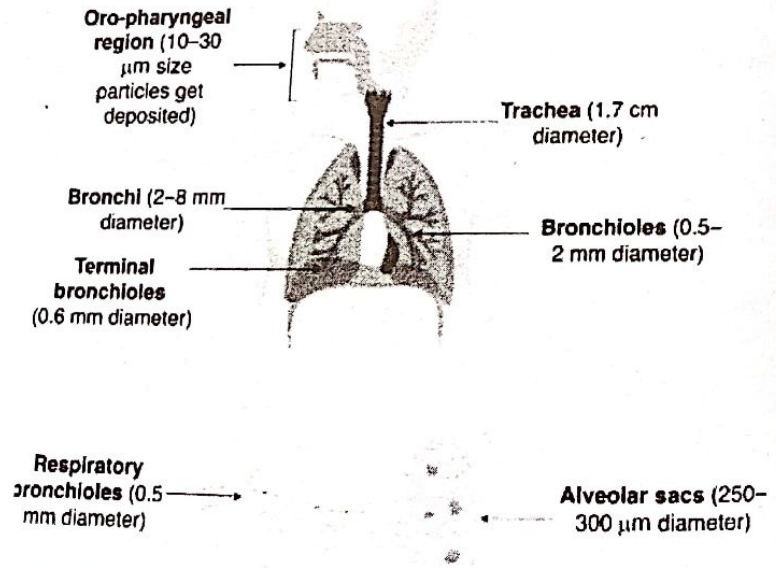


32.



33. Chylomicrons are the largest and least dense of the lipoproteins, formed in intestinal wall cells following digestion and absorption of fats. It transport ingested fats to all body cells and permit those cells to remove needed fats.

34.



35. **Vital capacity** is the total amount of air exhaled after maximal inhalation. The value is about 4800mL and it varies according to age and body size.

Tidal capacity is the volume of air moved into or out of the lungs during a normal breath. In a healthy, young human adult, tidal volume is approximately 500 ml per inspiration or 7 ml/kg of body mass.

Residual capacity is the volume remaining in the lungs after a normal, passive exhalation. In a normal individual, this is about 3L.

36. When PCO₂ increases, the oxygen tension decreases and oxygen holding capacity of hemoglobin becomes less. In this situation increases PCO₂ favours the greater liberation of O₂ from the blood to tissues.

37. Outer most layer of cells is epidermis.

38. Secretion of basophile:

Cell Type	Description	Average Number Present	Major Function
Basophil	About twice the size of red cells nucleus bilobed	Less than 1% of white cells	Releases heparin to prevent blood clots and histamine, which cause inflammation.

39. Bicuspid and tricuspid valves are present in left and right atrioventricular septa respectively. These valves are connected with papillary muscles through connective tissues called chordae tendineae. There are two papillary muscles in left and three papillary muscles in right ventricles

40. **Sponges** are asymmetrical and acoelomates.

Platyhelminthes are triploblast and acoelomates.

Annelida are triploblast and coelomates.

Aschelminthes are triploblast and psuedocoelomates.

41. Scientific names of carnivores plants are:

Sundew: *Drosera intermedia*

Pitcher plant: *Saracenia pupurea*

Venus fly trap: *Dionaea muscipula*

Morel is a fungi.

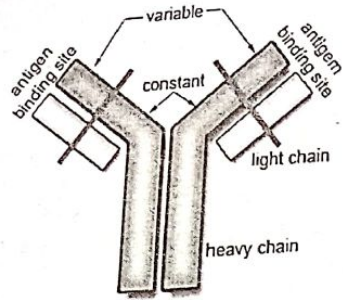
42. **Skin** and mucous membrane of the digestive and respiratory tract are external barrier and said to be first line of defense.

Following cells provide second line of defense:

- Monocytes
- Neutrophils
- Eosinophils.
- Basophils.

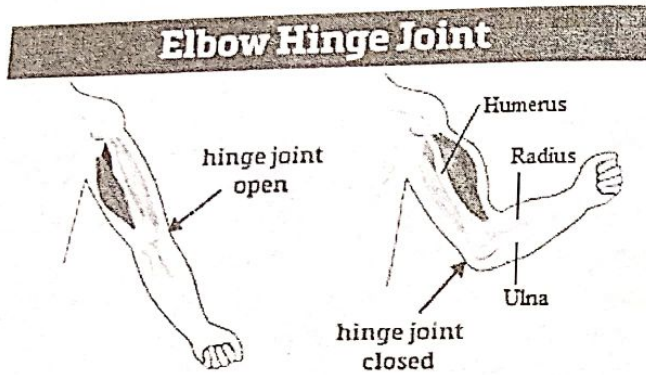
Lymphocytes (B and T cells) associate with third line of defense.

43.



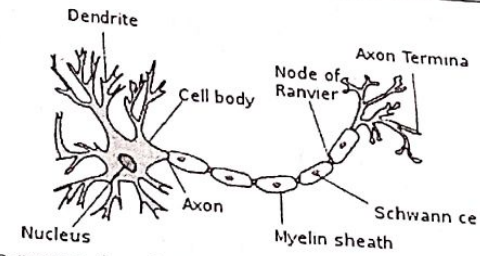
44. Senile RBCs are old RBCs, which become fragile due to their old age.
 45. All the veins have deoxygenated blood except pulmonary vein. And all the arteries have oxygenated blood except pulmonary artery.

46.

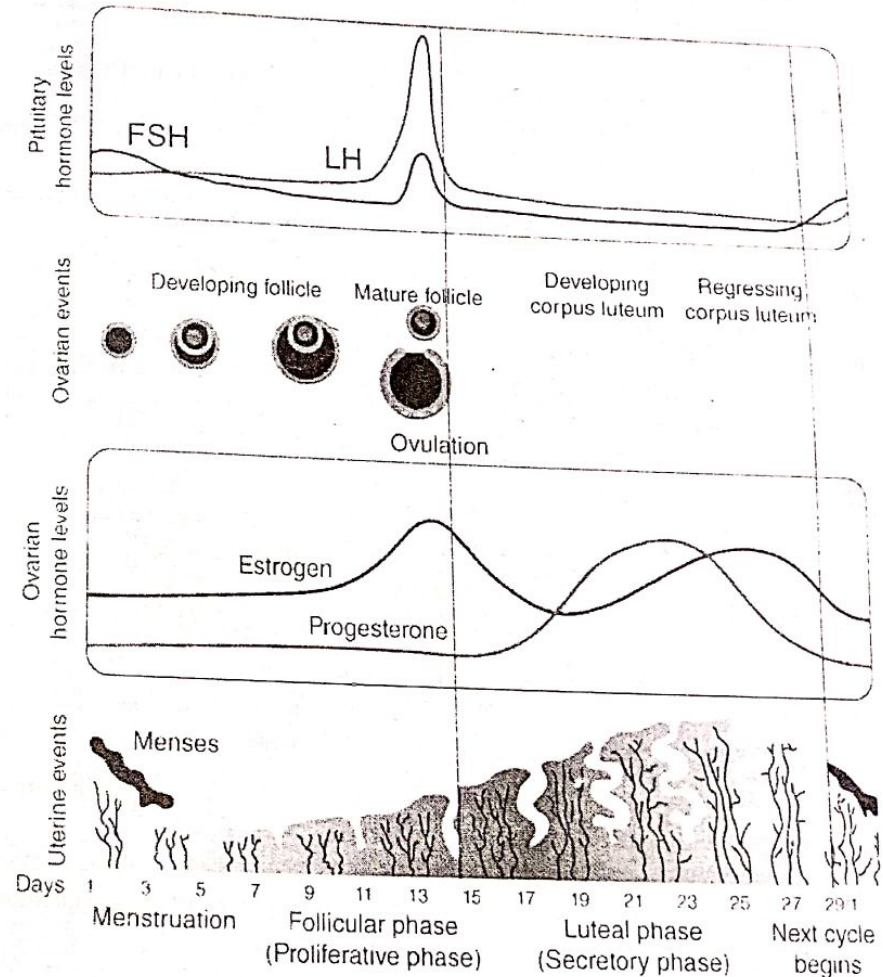


47. **Ligaments** are like cords made of connective tissue, elastic fibers that are somewhat stretchy, and collagen, a protein that binds tissues in animals.
 A **tendon** is composed of dense fibrous connective tissue made up primarily of collagenous fibres. Primary collagen fibres, which consist of bunches of collagen fibrils and are inelastic.
Capilleries are just made up of one celled thick endothelial tissues.
Bones contain ossien protein.
48. **ADH:** Hormone retain concentration of water in kidney and it is released from posterior lobe of pituitary gland.
ADH: Hormone retain concentration of water in kidney and it is released from posterior lobe of pituitary gland.
Oxytocin: Hormone released from posterior lobe of pituitary gland and causes distension of cervix during child birth.
MSH: Hormone released from middle lobe of pituitary gland causes dark spots on the skin as in Addison's disease.
Progesterone: Hormone released from ovaries that control birth.

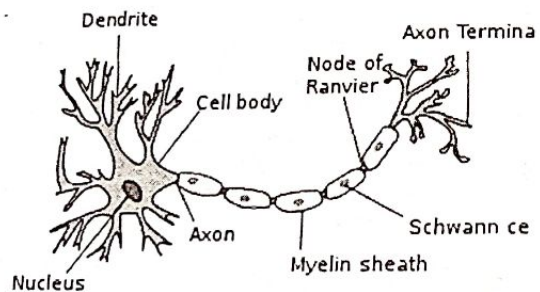
49.



50. Neurogenesis is the process by which nervous system cells, the neurons, are produced by neural stem cells. It occurs in all species of animals except the porifera (sponges).
 51.



52. Oogenesis. Oogenesis begins before birth but is not finished until after puberty. A mature egg forms only if a secondary oocyte is fertilized by a sperm. Oogenesis begins long before birth when an oogonium with the diploid number of chromosomes undergoes mitosis.
53. Hemophilia is usually an inherited bleeding disorder in which the blood does not clot properly. This can lead to spontaneous bleeding as well as bleeding following injuries or surgery.
54. A gene can have two allelic forms if allelic forms are more than two than it is termed as multiple allele.
55. Albinism is a rare genetic disorder where you aren't born with the usual amount of melanin pigment. Melanin is a chemical in your body that determines the color of your skin, hair and eyes. Most people with albinism have very pale skin, hair and eyes. They are prone to sunburn and skin cancer. Albinism is mostly an autosomal recessive disorder.
56. X-linked traits are transmitted in zigzag fashion (Grandfather to daughter to grandson) while Y-linked traits transmit direct from father to son.
57. AB blood group can be the example of codominance as both allele for antigen A and B are share the equal dominance.
58. Gene for colour blindness, haemophilia and gout form one linkage group on human X chromosome.
59. Evolution refers to the processes that have transformed life on earth from its earliest form to vast diversity that we observe today.
60. Cytochrome c a respiratory protein, is found in all aerobic species.
61. In fishes gills pouches develop into gills while in other terrestrial vertebrates these embryonic structures become modified for other functions, such as eustachian tubes that connect the middle ear with the throat in humans.
- 62.



63. The correct sequence of meninges from outer to the inner side is Dura mater, Arachnoid membrane and pia mater.
64. Release of corticotrophin releasing factor from the hypothalamus is controlled by steroid levels in the blood and by direct nervous stimulation of the hypothalamus as a result of stress.

65. It plays a central role in the regulation of blood pressure mainly by acting on organs such as the kidney and the colon to increase the amount of salt (sodium) reabsorbed into the bloodstream and to increase the amount of potassium excreted in the urine.
66. Testosterone is a sex hormone that plays important roles in the body. In men, it's thought to regulate sex drive, bone mass, fat distribution, muscle mass and strength, and the production of red blood cells and sperm.
67. The Graafian follicle is the follicular stage after the first meiotic division but before ovulation. It therefore contains a 2N haploid oocyte. It is characterized by a large follicular antrum that makes up most of the follicle.
68. Cartilage is a non-vascular type of supporting connective tissue that is found throughout the body. Cartilage is a flexible connective tissue that differs from bone in several ways; it is avascular and its microarchitecture is less organized than bone.

1 TOPIC

BIO-DIVERSITY (ACELLULAR LIFE/VARIETY OF LIFE)

PRACTICE EXERCISE

TOPIC-WISE MCQs

Discovery of Viruses

- Q.1 The filterable agents were first purified in 1935, when Stanley was successful in crystallizing the _____.
- A. Polio virus
B. Tobacco mosaic virus
C. Hepatitis virus
D. Influenza virus
- Q.2 Tobacco mosaic virus was discovered by:
- A. Stanley
B. Pasteur
C. Iwanowsky
D. D' Herelle

Characters of Viruses

- Q.3 Viruses cannot replicate in:
- A. Blood Plasma
B. Skin cell
C. A plant cell
D. Hepatocytes
- Q.4 Members of which of the following group are all parasites?
- A. Viruses
B. Fungi
C. Bacteria
D. Protozoa
- Q.5 Volume of bacteriophage is about _____ of host.
- A. 1/10
B. 1/100 times
C. 1/100
D. 1/1000
- Q.6 It is true for viruses:
- A. Viruses contain either DNA and RNA
B. Viruses are non-cellular
C. No independent metabolic activities
D. Tiny and infectious agent
- Q.7 Viruses cannot be grown on artificial culture media because they are:
- A. Facultative parasites
B. Endoparasites
C. Obligate intracellular parasites
D. Ectoparasites
- Q.8 Cilia and flagella are absent in: (MDCAT 2017)
- A. Viruses
B. Lower plants
C. Bacteria
D. Lower animals
- Q.9 Virus can only survive and reproduce inside a: (NTS 2019)
- A. Animal cells
B. Bacterial cells
C. Living cells
D. Non-living cells

Classification of Viruses

- Q.10 Which one of the following is double stranded virus?
- A. Poxvirus
B. Parvovirus
C. Reovirus
D. Togavirus
- Q.11 HIV is classified as: (MDCAT 2015)
- A. Bacteriophage
B. Retrovirus
C. Oncovirus
D. Icosahedral virus
- Q.12 The genome of influenza virus is made up of: (ETEA 2019)
- A. Single stranded RNA
B. Double stranded DNA
C. Single stranded DNA
D. Double stranded RNA

- Q.13 Polio viruses are:
 A. Tadpole shaped
 C. Spherical viruses
- Q.14 TMV are:
 A. Tadpole shaped
 C. Helical shaped
- Q.15 Which one is not RNA virus?
 A. Small pox virus
 C. Influenza virus

- B. Rod shaped viruses
 D. Spring like
- B. Rod shaped viruses
 D. Spherical viruses
- B. Mumps and Measles virus
 D. Polio virus

Structure of Viruses

- Q.16 Which of the following is composed of nucleic acids only?

- A. Virus
 C. Viroid
 B. Virion
 D. Prion

- Q.17 In prions, information is carried further through:

- A. DNA
 C. Proteins
 B. RNA
 D. Glycoproteins

- Q.18 It is present in all the viruses:

- A. DNA
 C. Capsid
 B. RNA
 D. Envelop

- Q.19 The component responsible for determination of shape of virus is:

- A. Type of nucleic acids
 C. Type of hosts
 B. Protein subunits
 D. Viral envelope

- Q.20 Which of the following is not essential part of virus?

- A. Nucleic acid
 C. Envelope
 B. Capsid
 D. None of these

- Q.21 A virion is a:

- A. Virus
 C. Viral lysozyme
 B. Capsid
 D. Viral gene

- Q.22 _____ capsomeres are present in capsid of herpes virus.

- A. 152
 C. 252
 B. 162
 D. 262

- Q.23 The genome of most of the animal viruses contain:

- A. DNA
 C. RNA
 B. Protein
 D. Both DNA and RNA

- Q.24 In viruses, a combined structure formed by core (Nucleic Acid) and capsid is:

- A. Nucleocapsid
 C. Envelope
 B. Capsomeres
 D. Prions

- Q.25 Capsid, the protective coat of a virus is made up of subunits known as capsomeres that are _____ in nature.

- A. Lipid
 C. Protein
 B. RNA
 D. DNA

- Q.26 Among followings, _____ enzyme is naturally found in human immunodeficiency virus.

- A. DNA polymerase
 C. RNA polymerase
 B. Reverse transcriptase
 D. Ligase

- Q.27 Genome of virus is composed of:

- A. DNA
 C. A and B
 B. RNA
 D. Protein (NTS 2019)

- Q.28 Which of the following is not related to enveloped virus?

- A. They survive for a short time
 C. Their envelop is sensitive to sunlight
 B. They are tolerant to antibiotics
 D. Envelope is derived from host (PMC 2020)

- Q.29 The complete mature and infection virus particle is known as:

- A. Venom
 C. Genome
 B. Virion
 D. Capsid (PMC 2020)

Bacteriophages

- Q.30 In lytic cycle of bacteriophage, the phage is regarded as:

- A. Master
 C. Guest
 B. Inducer
 D. Slave

- Q.31 The bacteriophage replicates only inside the:

- A. Animal cell
 C. Fungal cell
 B. Bacterial cell
 D. Both A & B (ETEA 2019)

- Q.32 The part of bacteriophage that enters the host cell is:

- A. Protein sheath
 C. Protein coat
 B. Genome
 D. Tail

- Q.33 The bacteriophage attaches itself by its tail to the cell wall of bacterium at:

- A. Anywhere on the cell
 C. Receptor site
 B. Adhering surface
 D. Binding site

- Q.34 When a virus is in the lysogenic cycle, which of these will occur?

- A. Viral DNA becomes incorporated into the host DNA
 C. The viral DNA replicates and it is separated by the cell's spindle apparatus
 D. Antiviral defenses of the cell expel the viral DNA
 B. Host cell produces many new viruses before it breaks apart

- Q.35 Enzyme that is present in a virus also:

- A. Dehydrogenase
 C. Lysozyme
 B. Urease
 D. Arginase

Viral Diseases

- Q.36 Most commonly, lesions can be seen around mouth, lips and at other skin sites in:

- A. Influenza
 C. Mumps
 B. Polio
 D. Herpes

- Q.37 Viral inflammation of parotid gland is commonly associated with:

- A. Mumps
 C. Herpes simplex
 B. Small pox
 D. Influenza

- Q.38 All of the following are viral diseases except:

- A. Influenza
 C. Mumps
 B. Polio
 D. Tetanus

- Q.39 Hepatitis A virus is:

- A. ssRNA
 C. dsDNA
 B. dsRNA
 D. ssDNA

- Q.40 HAV is transmitted through:

- A. Blood
 C. Fecal-oral route
 B. Serum
 D. Syringes

- Q.41 Virus that attack on spinal cord is:
 A. Rabies
 C. Toga virus
 B. HIV
 D. Poliovirus
- Q.42 Poliomyelitis affects:
 A. Sensory neuron
 C. Motor neuron
 B. Brain
 D. Muscles
- Q.43 Small pox is caused by pox virus which is:
 A. DNA Naked Virus
 C. RNA Naked Virus
 B. RNA Enveloped Virus
 D. DNA Enveloped Virus
- Q.44 Mad cow disease is caused by:
 A. Virus
 C. Viroid
 B. Virion
 D. Prion
- Q.45 Hepatitis C is also known as:
 A. Infections Hepatitis
 C. Infusion Hepatitis
 B. Serum Hepatitis
 D. Delta Hepatitis
- Q.46 Pigs are reservoir for:
 A. Hepatitis A
 C. Hepatitis C
 B. Hepatitis B
 D. Hepatitis E
- Q.47 The enzyme involved in viral replication are synthesized:
 A. By the host cell
 C. On the viral ribosomes
 B. On the interior surface of viral membrane
 D. On the interior surface of viral coat
- Q.48 Ribavirin is used to treat:
 A. Hepatitis C
 C. Hepatitis A
 B. Hepatitis B
 D. Hepatitis D
- Q.49 Virus that affects genital organs:
 A. HCV
 C. HIV
 B. HSV
 D. Pox virus
- Q.50 Which of the following pair of diseases is viral?
 A. Rabies, Measles
 C. Typhoid, Tetanus
 B. Cholera, Tuberculosis
 D. AIDS, Syphilis
- Q.51 Which virus that infects humans has no vector and is unable to survive outside human body? (KMDC 2014)
 A. Polio virus
 C. Chicken pox virus
 B. Mumps virus
 D. None of these
- Q.52 Polio vaccine is given by: (KMDC 2014)
 A. Spray
 C. Oral drops
 B. Tablets
 D. Local application
- Q.53 Which of the following is the simplest forms of pathogens causing disease? (NTS 2018)
 A. Viruses
 C. Fungus
 B. Prions
 D. Amoeba
- Q.54 Which is not a viral disease? (NTS 2018)
 A. AIDS
 C. Chicken pox
 B. Malaria
 D. Influenza
- Q.55 Oral herpes is caused by:
 A. HIV-2
 C. HSV-2
 B. HCV
 D. HSV-1

- Q.56 Which of the following diseases is caused by a viroid?
 A. AIDS
 C. Hepatitis C
 B. Hepatitis B
 D. Hepatitis D
- Q.57 _____ is known to cause cancers in animals.
 A. Polio virus
 C. HIV
 B. HBV
 D. Rous sarcoma virus
- HIV and AIDS**
- Q.58 Retroviruses contain:
 A. Single stranded RNA
 C. Single stranded DNA
 B. Double stranded RNA
 D. Double stranded DNA
- Q.59 Major Cells that are infected by HIV are:
 A. B-lymphocytes
 C. Natural cells
 B. T-Helper cells
 D. T-Lymphocytes
- Q.60 It acts as a template strand for reverse transcriptase:
 A. Viral DNA
 C. Viral RNA
 B. Host DNA
 D. T-lymphocytes
- Q.61 The phenomenon of transcription in HIV life cycle occurs in:
 A. Nucleus
 C. Cytoplasm
 B. Inside viral capsid
 D. None of these
- Q.62 Attachment of HIV DNA with host DNA is done via action of:
 A. Integrase
 C. Protease
 B. Reverse transcriptase
 D. Nuclease
- Q.63 HIV can be transmitted by all of the following sources except:
 A. Intimate sexual contact
 C. Breast feeding
 B. Contact with blood
 D. Saliva
- Q.64 Uncoating of HIV virion occurs:
 A. Outside the cell
 C. In nucleus
 B. In cytoplasm
 D. At any place
- Q.65 Protein of HIV that helps in its fusion with T cell:
 A. gp31
 C. gp141
 B. gp120
 D. gp41
- Q.66 Common among all viruses during their infection cycles:
 A. DNA Replication in cytoplasm
 C. Transcription in nucleus
 B. Translation in cytoplasm
 D. Reverse transcription in cytoplasm
- Q.67 Receptors proteins present on T helper lymphocytes where an HIV particle binds:
 A. CD4
 C. CD2
 B. CD8
 D. CD1
- Q.68 Which of the following cells does HIV mainly infect? (MDCAT 2014)
 A. T-killer lymphocytes
 C. T-helper lymphocytes
 B. B-plasma cells
 D. B-memory cells
- Q.69 AIDS is caused by: (MDCAT 2016)
 A. Bacteria
 C. Virus
 B. Fungi
 D. Alga
- Q.70 Which one is not an opportunistic disease related to HIV infection? (ETEA 2017)
 A. Destruction of body immune system
 C. Pulmonary tuberculosis
 B. Recurrent pneumonia
 D. Toxoplasmosis

- Q.71 The main target of HIV in AIDS is:
 A. Liver cells
 B. B-lymphocytes
 C. Red blood cells
 D. Helper T-lymphocytes
- Q.72 Numerous opportunistic diseases might attack a person suffering from which of the following diseases:
 A. Measles
 B. Hepatitis A
 C. Influenza
 D. AIDS
- Q.73 Which of the following is not true about human immunodeficiency virus?
 A. It is a retrovirus
 B. It is surrounded by an envelope
 C. It does not cause AIDS
 D. It causes deficiency of the human immune system

(PMC 2020)

(PMC 2020)

ANSWER KEY

TOPIC-WISE MCQs & PASPT PAPER MCQs

1	B	11	B	21	A	31	B	41	D	51	D	61	A	71	D
2	C	12	A	22	B	32	B	42	C	52	C	62	A	72	D
3	A	13	C	23	C	33	B	43	D	53	B	63	D	73	C
4	A	14	B	24	A	34	A	44	D	54	B	64	B		
5	D	15	A	25	C	35	C	45	C	55	D	65	D		
6	C	16	C	26	B	36	D	46	D	56	D	66	B		
7	C	17	C	27	C	37	A	47	A	57	D	67	A		
8	A	18	C	28	B	38	D	48	C	58	A	68	C		
9	C	19	B	29	B	39	A	49	B	59	B	69	C		
10	A	20	C	30	A	40	C	50	A	60	C	70	A		

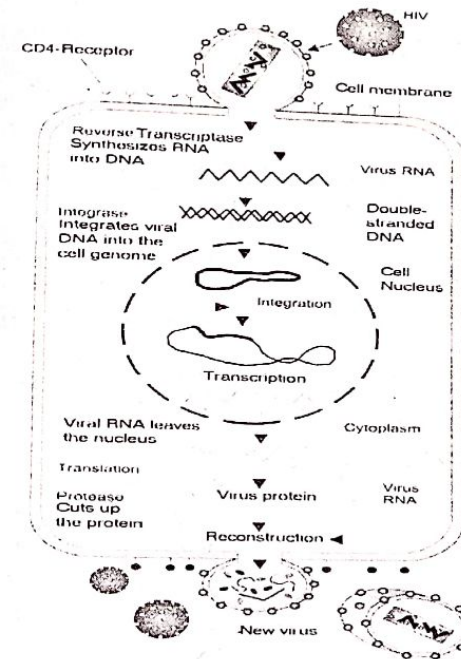
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

- Stanley was the first scientist who crystallized tobacco mosaic virus in 1935.
- Iwanowsky was a Russian scientist who worked on tobacco mosaic virus. He ground diseased leaves of tobacco plants and filtered them using porcelain filter. He put this filtrate on healthy leaves and they got disease. This showed tobacco plants were not infected by bacteria but by viruses.
- One of the most important features of viruses is that they can reproduce only in living cells, where they reproduce by replication. Therefore, viruses are said to be the obligate intra-cellular parasites. Blood without blood cells is blood plasma and it cannot provide machinery for viral replication.
- All viruses are parasites while in other groups, some are parasites and some are beneficial.
- Viruses are very small. Size of largest virus (Poxvirus) is almost equal to size of smallest bacteria.
- Virus grow inside the cell of host. They do not have their own metabolism.
- Viruses cannot be grown in artificial media because they lack metabolic machinery for the synthesis of their own nucleic acids and proteins.
- Viruses are infectious particles made up of protein coat known as capsid and genome either DNA or RNA. Both cilia and flagella are absent in viruses.
- Viruses are obligate intracellular parasites.
- Viruses are classified on different basis such as capsid shape, types of hosts and genome. On basis of genome there are many categories of viruses such as:
 - Double stranded DNA viruses
 - Single stranded DNA viruses
 - Double stranded RNA viruses
 - Single stranded viruses etc.
- Retroviruses are RNA viruses. After infecting their host cells, the *retrovirus* uses an enzyme called reverse transcriptase to convert its genomic RNA into DNA. The *retrovirus* then integrates its viral DNA into the DNA of the host cell, which allows the *retrovirus* to replicate. One typical example of retrovirus is HIV.
- Influenza is RNA enveloped virus.
- Common shapes of viruses:
 - Spherical (Polio)
 - Rod-like (TMV)
 - Tadpole (Lambda phages)
- Common shapes of viruses:
 - Spherical (Polio)
 - Rod-like (TMV)
 - Tadpole (Lambda phages)
- Poxvirus is DNA enveloped; Mumps, measles and poliovirus have RNA as their genetic material.

37. Mumps belongs to group paramyxoviruses. It is highly contagious and this disease cause painful swelling of parotid glands.
38. Tetanus is a bacterial disease caused by *Clostridium tetani*.
39. Viruses can be classifying on the bases of genome, HAV contains single standard RNA. HBV contains DNA and HCV contains RNA.
40. The virus spreads by the fecal-oral route, and infections often occur in conditions of poor sanitation and overcrowding.
41. Poliovirus replicates in oropharynx, intestine and spread through blood to nervous system. Poliovirus replicates in motor neuron located in spinal cord. Death of these cell result in paralysis.
42. Poliovirus replicates in oropharynx, intestine and spread through blood to nervous system. Poliovirus replicates in motor neuron located in spinal cord. Death of these cell result in paralysis.
43. Poxvirus is DNA enveloped virus, which caused epidemic in the past causing small pox, but now this disease, has been eradicated from the world.
44. Prions are infectious particles made up of only proteins containing information for replication and cause mad cow infection and mysterious brain infection in man.
45. Hepatitis C virus is RNA enveloped virus that causes infusion hepatitis. Hepatitis A is known as infectious hepatitis, while the common name of hepatitis B is serum hepatitis.
46. Most recent work of Halbur and coworker (2001) reveals that pig could be the source of infection of hepatitis E.
47. Viruses are obligate intracellular parasites. They use host biosynthetic machinery for protein synthesis.
48. There are different types of hepatitis viruses that cause disease in humans. One of them is HCV: an RNA virus that affects liver and causes hepatitis. It is treated with interferons and an antiviral drug known as ribavirin.
49. Different viruses attack different parts of human body such as hepatitis virus affects liver and polio virus affects nervous system. There are two types of herpes simplex viruses. HSV-1 affects lips and mouth parts and is called oral herpes. HSV-2 damages genital organs and is called as genital herpes.
50. Cholera, typhoid, tuberculosis, syphilis and tetanus are bacterial diseases.
51. All viruses cause infection in human beings and get transferred by specific vector. Viruses always depends on living host for their survival.
52. Live vaccine of polio given orally, while killed vaccines given by injection.
53. Prions are simplest form of pathogens because they are only proteins structurally. Viruses are nucleoproteins. Fungi is multicellular and eukaryotic organisms. Amoeba is eukaryotic and unicellular organism.
54. Malaria is caused by *Plasmodium* which is animals like protists.
55. The causative agent of oral herpes is Herpes Simplex Virus type 2.
56. The only known human disease caused by a viroid is hepatitis D.
57. Rous sarcoma virus (RSV) is an Oncovirus, which is known to cause sarcomas (tissue cancers) in fowls.
58. All retroviruses are RNA viruses, containing copies of single stranded RNA as genome.

59. HIV attacks on specific type of immune cell in the body, known as T-helper cells. When HIV destroys these cells, then it becomes difficult for the body to fight against the infections.
60. HIV is equipped with reverse transcriptase along with the other essential enzymes. Reverse transcriptase is responsible for reverse transcription, during which viral genomic ssRNA is converted into viral dsDNA in the cytoplasm of helper T-cells.
61. In HIV infected helper T-cells, the process of transcription occurs in nucleus while the process of reverse transcription occurs in cytoplasm.
62. HIV integration is the insertion of HIV genetic material into the genome of the infected cell. This process is completed with the help of integrase.
63. Modes of transmission of HIV are blood transfusion, sexual contacts and breast-feeding. Saliva is not the source of transmission of HIV.
- 64.



65. Different proteins are embedded in the HIV envelope. One is gp120 that is needed to attach to the host cell and other is gp41, which is critical for fusion process. Both are part of spikes of viral envelope.
66. Viruses attack target cells and use biosynthetic machinery (ribosomes: present in cytoplasm) of host for protein synthesis. DNA replication and transcription of different viruses take place in cytoplasm and nucleus of host cells.
67. CD means cluster of differentiation. There are many types of CD proteins such as CD4 and CD8 etc. attached to cell membrane of different types of T cells. HIV attaches with CD4 that is part of T helper cell membrane.

68. HIV attacks a specific type of immune cell in the body, known as T-helper cells. When HIV destroys these cells, then it becomes difficult for the body to fight against the infections.
69. AIDS is a chronic, potentially life-threatening condition caused by the HIV. By damaging the immune system, HIV interferes with body's ability to fight infection and disease.
70. Opportunistic infections (OIs) are infections that occur more often or are more severe in people with weakened immune systems than in people with healthy immune systems. People with weakened immune systems include people living with HIV.
71. HIV infects a type of white blood cell in the body's immune system called a T-helper cell (also called a CD4 cell). These vital cells keep us healthy by fighting off infections and diseases.
72. AIDS results into loss of immunity, which may leads to opportunistic infection.
73. Causative agent of AIDS is HIV.

2
TOPIC

BIO-ENERGETICS

PRACTICE EXERCISE

TOPIC-WISE MCQs

Introduction to Bioenergetics and Photosynthesis

- Q.1 The most abundant protein in chloroplast is:
 A. Rubisco
 C. Ribulose bisphosphate
 B. RUBP
 D. Ribulose bisphosphate hydrogenase
- Q.2 The products of photosynthesis in green plants are:
 A. $C_6H_{12}O_6 + 6O_2$
 C. $C_6H_{12}O_6 + 6O_2 + H_2O + \text{energy}$
 B. $(CH_2O)_n + H_2O + 2S$
 D. $C_6H_{12}O_6 + 6O_2 + 6 H_2O$
- Q.3 Incorrect statement for photosynthesis is:
 A. It occurs during daytime
 C. It requires chlorophyll
 B. It uses water with CO_2
 D. It uses oxygen

Role of Light, H_2O and CO_2

- Q.4 Spectrophotometer is used to measure:
 A. Absorption of CO_2
 C. Reflection of pigments
 B. Absorption of O_2
 D. Absorption of different wavelengths
- Q.5 Which shows the effectiveness of wavelengths of light driving photosynthesis?
 A. Absorption spectrum
 C. Broad spectrum
 B. Action spectrum
 D. Narrow spectrum
- Q.6 Conversion of light energy into chemical energy is function of:
 A. Mitochondria
 C. Stroma of chloroplast
 B. Cytoplasm
 D. Grana
- Q.7 The source of oxygen released during photosynthesis is:
 A. Water
 C. Glucose
 B. CO_2
 D. Oxidation of chlorophyll
- Q.8 Van Neil hypothesis about the production of oxygen during photosynthesis was based on the study and investigations on:
 A. Bacteria
 C. Protonema
 B. Algae
 D. Cyanobacteria
- Q.9 Wavelength of blue light that is absorbed maximum by pigments:
 A. 670 nm
 C. 430 nm
 B. 540 nm
 D. 750 nm
- Q.10 Which of the following groups does not use water as proton donor?
 A. Cyanobacteria
 C. Plants
 B. Purple sulphur bacteria
 D. Algae
- Q.11 Air contains _____ percentage of carbon dioxide.
 A. 0.04-0.05
 C. 0.06-0.08
 B. 0.01-0.02
 D. 0.03-0.04

Role of Photosynthetic Pigments

- Q.12 Carotenoids absorb strongly:
 A. Red to orange
 C. Yellow red
 B. Yellow green
 D. Blue violet

- Q.13** Magnesium is central part of:
 A. Porphyrin ring
 B. Phytol tail
 C. Pyrrole ring
 D. Hydrophobic part
- Q.14** Chlorophyll consists of:
 A. A head of phytol and tail of four pyrrole rings
 B. A head of linked carbons and tail of four pyrrole rings
 C. A head of four pyrrole rings and tail of linked nitrogen
 D. A head of four pyrrole rings and a phytol tail
- Q.15** Following is correct sequence of energy transfer between photosynthetic pigments:
 A. Chl.a→Chl.b→Carotenoids
 B. Carotenoids→Chl.b→Chl.a
 C. Chl.b→Carotenoids→Chl.a
 D. In any direction
- Q.16** All of the followings are differences between Chl. 'a' and 'b' except:
 A. Chl.a has different types while Chl.b has single type
 B. Chl.a have functional group -CH₃ but Chl.b has -CHO
 C. Chl.a is necessary pigment but Chl.b is accessory pigments
 D. Chl.a is present in antenna complex while Chl.b is in reaction center
- Q.17** Location of phytol tail of chlorophyll b is:
 A. Stroma
 B. Thylakoid membrane
 C. Thylakoid surface
 D. Thylakoid lumen
- Q.18** Which one of the following is not function of carotenoids?
 A. Convert light energy into chemical energy
 B. Protect Chlorophyll
 C. Transfer energy
 D. Protect human eye
- Q.19** Location of photosynthetic pigments in purple sulphur bacteria:
 A. Thylakoids
 B. Grana
 C. Stroma
 D. Cytoplasm

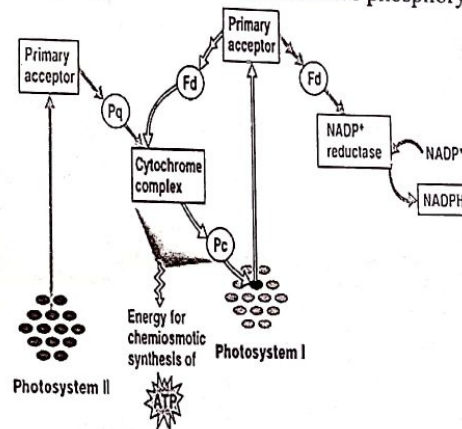
Mechanism of Photosynthesis and Photosystems

- Q.20** PS-I is named as it:
 A. Absorbs wavelength of 680 nm
 B. Discovered earlier than PS-II
 C. Absorbs wavelength of 700 nm
 D. Slightly located upward than PS-II
- Q.21** Photosystem II has reaction center of:
 A. P₆₈₀
 B. P₇₀₀
 C. P₇₃₀
 D. P₆₆₀
- Q.22** During cyclic photophosphorylation, electrons pass from all except:
 A. Photosystem I
 B. Ferredoxin
 C. Photosystem II
 D. Cytochrome complex
- Q.23** Some photosynthetic organisms contain chloroplasts that lack photosystem II, yet are able to survive. The best way to detect the "lack of photosystem II" in these organisms would be:
 A. To determine if they have thylakoids in the chloroplasts
 B. To test for liberation of O₂ in the light
 C. To test for CO₂ fixation in the dark
 D. To do experiments to generate an action spectrum

Light Reactions (Non-Cyclic and Cyclic Photophosphorylation)

- Q.24** Where do the light reactions take place?
 A. Stroma
 B. Thylakoid membrane
 C. Chloroplast
 D. Leucoplast

- Q.25** The final acceptor of electrons during the noncyclic electron pathway is:
 A. Photosystem I
 B. Photosystem II
 C. ATP
 D. NADP⁺
- Q.26** Each photon of light excites how many electrons?
 A. 1
 B. 4
 C. 2
 D. 6
- Q.27** Water splits during photosynthesis in/on:
 A. Interior space of thylakoid
 B. Outside the thylakoid membrane
 C. Into the stroma
 D. At ATP synthase complex
- Q.28** NADP⁺ reductase transfers electron from:
 A. NADP⁺ to ferredoxin
 B. Ferredoxin to NADP⁺
 C. ADP to ATP
 D. Cytochrome complex to NADP⁺
- Q.29** Which of the following is correct sequence for the movement of electrons during non-cycling photophosphorylation?
 A. P₆₈₀→P₇₀₀→water→NADP⁺
 B. Water →P₇₀₀→P₆₈₀→NADP⁺
 C. Water→P₆₈₀→P₇₀₀→NADP⁺
 D. P₆₈₀→P₇₀₀→NADP⁺→water
- Q.30** Which statement is not true about the noncyclic electron pathway?
 A. It absorbs photons into PS-I
 B. It is a long pathway
 C. It produces ATP
 D. Carbon dioxide fixation
- Q.31** NADPH₂ is produced in photosynthesis during:
 A. Dark reaction
 B. Pseudo cyclic photophosphorylation
 C. Non-cyclic photophosphorylation
 D. Cyclic photophosphorylation
- Q.32** Z-scheme is another name used for:
 A. Cyclic photophosphorylation
 B. Calvin cycle
 C. Non-cyclic photophosphorylation
 D. Oxidative phosphorylation



Light Independent Reactions/Dark Reaction

- Q.33** Which is not true for dark reaction?
 A. Does not require light directly
 B. It uses ATP
 C. Also called Z-scheme
 D. G₃P is produced
- Q.34** The process in which carbon from CO₂ is incorporated into organic molecules:
 A. Glycolysis
 B. Calvin cycle
 C. Krebs cycle
 D. Light dependent reactions

- Q.35 Which is associated with the Calvin cycle?
 A. ATP production
 B. Oxygen production
 C. Carbon dioxide fixation
 D. Carbon dioxide production
- Q.36 The product of the dark reaction is:
 A. ATP
 B. NADPH
 C. G₃P
 D. PEP
- Q.37 If 12 NADPH are used in Calvin cycle, then how many glucose molecules will be formed:
 A. One
 B. Six
 C. Two
 D. Twelve
- Q.38 Calvin cycle is also known as C₃ pathway due to:
 A. Initial incorporation of 3 CO₂ molecules
 B. Production of 3 carbon G₃P
 C. Production of 3 carbon 3PGA
 D. Cycle has 3 steps
- Q.39 For fixing 3 molecules of CO₂ in Calvin cycle, what is needed?
 A. 9ATP + 6NADPH₂
 B. 18ATP + 12NADPH₂
 C. 6ATP + 9NADPH₂
 D. 3ATP + 3NADPH₂

Cellular Respiration (Types and Mechanism of Anaerobic Respiration)

- Q.40 NADH is oxidized during:
 A. Glycolysis
 B. Krebs cycle
 C. Lactic acid fermentation
 D. Dark reactions
- Q.41 Which of the following can perform anaerobic respiration?
 A. Bacteria
 B. Yeast
 C. Skeletal muscles
 D. All A, B, C
- Q.42 Amount of energy extracted from glucose molecule during respiration without oxygen is:
 A. 4%
 B. 2%
 C. 6%
 D. 8%
- Q.43 The final fate of glucose in yeast when it is deprived of oxygen:
 A. Lactate
 B. Pyruvate
 C. Acetaldehyde
 D. Alcohol
- Q.44 In cellular respiration, product formed as a result of release of energy:
 A. ATP
 B. Oxygen
 C. NADH
 D. Glucose

Mechanism of Aerobic Respiration, Glycolysis, P.A.O and Krebs cycle

- Q.45 Number of ATP molecules used during preparatory phase of glycolysis:
 A. 2
 B. 4
 C. 1
 D. 6
- Q.46 In plants, energy is released during the process of:
 A. Photosynthesis
 B. Respiration
 C. Transpiration
 D. Water absorption
- Q.47 Water is released during conversion of:
 A. 2-phosphoglycerate → PEP
 B. 3-phosphoglycerate → 2-phosphoglycerate
 C. 1,3 bisphosphoglycerate → 3-phosphoglycerate
 D. G₃P → 1,3 bisphosphoglycerate

- Q.48 Which one of the following represents de-phosphorylation?
 A. Fructose 1-phosphate → Fructose 1,6-biphosphate
 B. Fructose 1,3 bisphosphoglycerate → 3 phosphoglycerate
 C. Fructose 1-phosphate → Fructose 6-phosphate
 D. Glucose 6-phosphate → Fructose 1-phosphate
- Q.49 Gross production of ATP molecules during glycolysis is:
 A. 2
 B. 4
 C. 6
 D. 8
- Q.50 The net gain of energy from one molecule of glucose during aerobic respiration in prokaryotes is:
 A. 2 ATP
 B. 38 ATP
 C. 4 ATP
 D. 40 ATP
- Q.51 The oxidation of succinate produces:
 A. NADH
 B. FADH₂
 C. Malate
 D. ATP
- Q.52 Both NADH and FADH₂ are formed during:
 A. Glycolysis
 B. The electron transport system
 C. Krebs cycle
 D. Fermentation
- Q.53 When products of glycolysis pass through Krebs cycle, it will produce:
 A. 2 NADH, 2 FADH₂, 2 ATP
 B. 1 NADH, 1 FADH₂, 1 ATP
 C. 1 NADH, 3 FADH₂, 2 ATP
 D. 6 NADH, 2 FADH₂, 2 ATP
- Q.54 The precursor of fumarate during Krebs cycle require _____ for fumarate synthesis.
 A. Succinate
 B. Fumarate dehydrogenase
 C. Succinate dehydrogenase
 D. FAD⁺ Oxidase
- Q.55 Before pyruvate enters the citric acid cycle, it is decarboxylated, oxidized and combined with coenzyme A, forming acetyl CoA, carbon dioxide and one molecule of:
 A. NADH
 B. FADH₂
 C. ATP
 D. ADP
- Q.56 Starting from end products of glycolysis, how many molecules of CO₂ are produced up to the formation of succinate in a single Krebs cycle?
 A. 2
 B. 12
 C. 6
 D. 3
- Q.57 Which of the following process is used in the conversion of pyruvate to acetyl CoA?
 A. Decarboxylation
 B. Dehydration
 C. Dehydrogenation
 D. Both A and C
- Q.58 Biological oxidation involves removal of hydrogen, linked with specific coenzymes and is catalyzed by:
 A. Carboxylase
 B. Hydrogenase
 C. Dehydrogenase
 D. Catalase
- Q.59 Phosphorylation of ADP during glycolysis occurs via:
 A. Photophosphorylation
 B. Oxidative phosphorylation
 C. Chemiosmosis
 D. Substrate level phosphorylation
- Q.60 Before entering Krebs cycle, the pyruvate decarboxylated into:
 A. α-ketoglutaric acid
 B. Glyceric acid
 C. Citric acid
 D. Acetaldehyde

PMC Topic-2

E.T.C. Chemiosmosis and Oxidative Phosphorylation

- Q.61 During respiratory chain of cellular respiration, cytochrome c oxidizes:
 A. Cytochrome a
 B. Cytochrome b
 C. Cytochrome a₃
 D. Cytochrome a complex
- Q.62 Which of the following is the final acceptor of electron in respiratory chain?
 A. Cytochrome a
 B. Cytochrome a₃
 C. Oxygen
 D. Hydrogen
- Q.63 Electron transport chain in mitochondria is used to:
 A. Synthesize NADP⁺
 B. Synthesize ADP
 C. Create electron gradient
 D. Create proton gradient
- Q.64 Which of the following types of mammalian cell does not carry out oxidative phosphorylation?
 A. Erythrocytes
 B. Neuron
 C. Oxyntic cell
 D. Cardiac muscle cell
- Q.65 The stage of cellular respiration producing maximum ATP:
 A. Glycolysis
 B. Oxidation of pyruvate
 C. Krebs cycle
 D. Chemiosmosis
- Q.66 ATP formation through oxidative phosphorylation involves:
 A. Light reactions
 B. Dark reactions
 C. Chemiosmosis
 D. Fermentation

Regulation of Cellular Respiration

- Q.67 Phosphofructokinase is inhibited by:
 A. High concentration of NADH
 B. Low concentration of citrate
 C. High concentration of ATP
 D. Pyruvate decarboxylase
- Q.68 High concentration of NADH inhibits:
 A. Pyruvate decarboxylase
 B. Phosphofructokinase
 C. Glucokinase
 D. Pyruvate kinase

Importance of G3P

- Q.69 A Aldo sugar that is intermediate between respiration and photosynthesis:
 A. Glucose
 B. Dihydroxyacetone
 C. Glyceraldehyde 3-phosphate
 D. Fructose
- Q.70 G₃P is converted into glucose phosphate in:
 A. Mitochondria
 B. Chloroplast
 C. Golgi apparatus
 D. Endoplasmic reticulum

Cellular Respiration of Fats and Proteins

- Q.71 An 18 carbon fatty acid is converted into how many acetyl-CoA molecules?
 A. 18
 B. 16
 C. 9
 D. 18
- Q.72 Deamination of amino acid takes place in:
 A. Liver
 B. Kidney
 C. Pancreas
 D. Gall bladder

ANSWER KEY

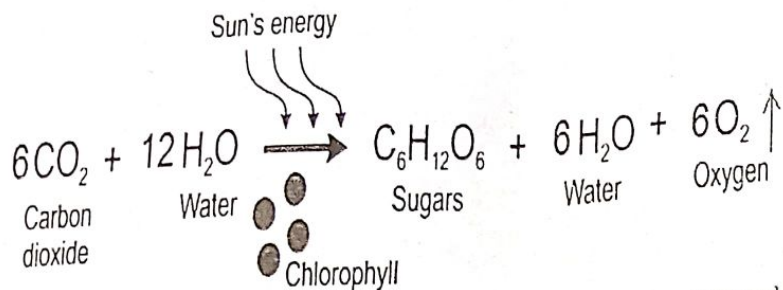
TOPIC-WISE MCQs & PAST PAPER MCQs

1	A	16	D	31	C	46	B	61	B
2	D	17	B	32	C	47	A	62	C
3	D	18	A	33	C	48	B	63	D
4	B	19	D	34	B	49	B	64	A
5	D	20	B	35	C	50	B	65	D
6	A	21	A	36	C	51	B	66	C
7	A	22	C	37	A	52	C	67	C
8	C	23	D	38	C	53	D	68	A
9	B	24	B	39	A	54	C	69	C
10	D	25	D	40	C	55	A	70	B
11	D	26	A	41	D	56	D	71	C
12	D	27	A	42	B	57	D	72	A
13	A	28	B	43	D	58	C		
14	D	29	C	44	A	59	D		
15	B	30	D	45	A	60	D		

EXPLANATORY NOTES

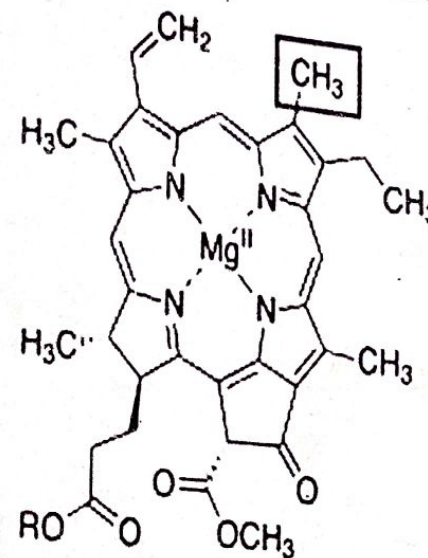
TOPIC-WISE MCQs & PAST PAPER MCQs

1. Carbon dioxide fixation in dark reaction is carried out by the enzyme Ribulose biphosphate carboxylase, also known as Rubisco. It is the most abundant protein in chloroplasts, and probably the most abundant protein on earth.
- 2.



3. Photosynthesis is the biochemical process that occurs during day time and requires chlorophyll for sugar synthesis and uses CO₂ as reactant. O₂, however, is produced as by-product during light dependent phase of photosynthesis and consumed during cellular respiration.
4. Spectrophotometer is an electrical instrument, which is used to measure the relative abilities of different pigments to absorb different wavelengths of light.
5. The graph showing relative effectiveness of different wavelengths of light in driving photosynthesis is called action spectrum. It was reported by T.W Engelmann
6. Light dependent phase of photosynthesis takes place in grana of chloroplast in which light energy is converted into chemical energy.
7. The source of oxygen released during photosynthesis is water. This was confirmed by scientists Van Niel during 1940s when first use of an isotopic tracer (O¹⁸) in biological research was made.
8. Using evidence from bacteria that utilize hydrogen sulfide (H₂S) for photosynthesis, van Niel hypothesized that all photosynthetic organisms need a hydrogen source and that plants split water as their hydrogen source, releasing oxygen. Scientists confirmed this hypothesis by using a heavy isotope of oxygen (O¹⁸).
9. Wavelength of visible light varies from 380 nm to 750 nm. This spectrum contains seven different colors. Out of them blue and red wavelengths are absorbed maximally. 430 nm and 670 nm are most effective and they represent blue and red color respectively.
10. Photosynthetic bacteria use hydrogen sulphide as proton donor. Rest of organisms use water as proton donor for photosynthesis.
11. Air contains very less amount of carbon dioxide. Water contains more carbon dioxide than air.
12. Carotenoids are yellow and red to orange pigments that absorb strongly the blue-violet range, different wavelengths than the chlorophyll absorbs, so they broaden the spectrum of light that provide energy for photosynthesis.

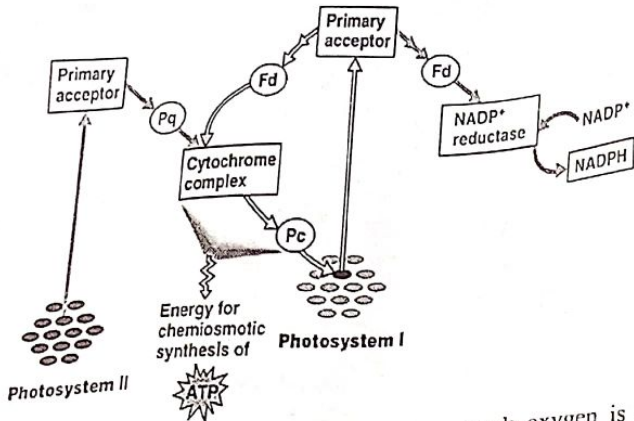
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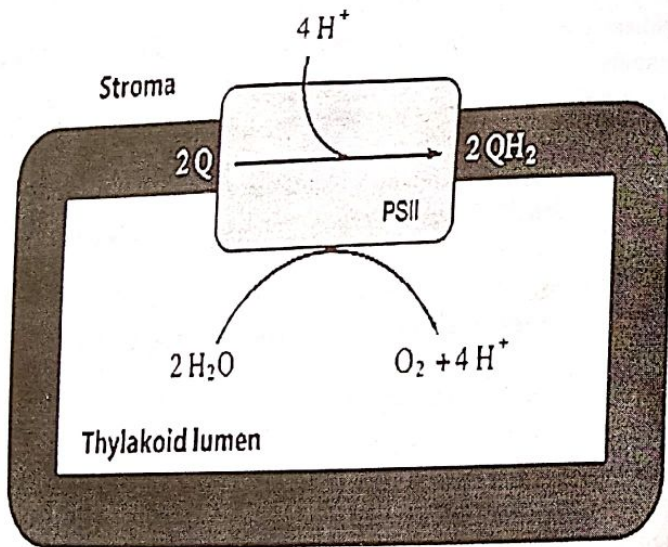
14. A chlorophyll molecule has two main parts; one flat, light absorbing hydrophilic head and the other long, anchoring, hydrophobic hydrocarbon tail. The head is complex porphyrin ring which is made up of four joined smaller pyrrole rings.
15. Carotenoids and chlorophyll 'b' are called accessory pigments because they absorb light and transfer the energy to chlorophyll a, which then initiates the light reactions. It is generally believed that the order of transfer of energy is.
16. The antenna complex has many molecules of chlorophyll 'a', chlorophyll 'b' and carotenoids, most of them channeling the energy to reaction center. Reaction center has one or more molecules of chlorophyll 'a' along with primary electron acceptors, and associated electron carries of E.T.C.
17. Chlorophyll molecule has a long hydrocarbon tail which is attached to one of the pyrrole rings of chlorophyll molecules and is embedded in the hydrophobic core of thylakoid membrane.
18. Transfer of energy, broadening the spectrum, protection of chlorophyll molecules and eyes are the functions of carotenoids. The conversion of light energy into chemical energy is the function of chlorophyll molecules.
19. Some bacteria are photosynthetic but they lack chloroplast. Their photosynthetic pigments are present in cytoplasm of cell.
20. Photosynthetic pigments are organized into clusters, called photosystems. There are two photosystems found in plants, PS-I and PS-II. These are named so in order of their discovery.
21. There are two types of photosystems named as PS I and PS II. PS I has type of chlorophyll a that absorbs maximum wavelength of 700 nm while PS II has type of chlorophyll a that absorbs maximum wavelength of 680 nm.

PMC Topic-2

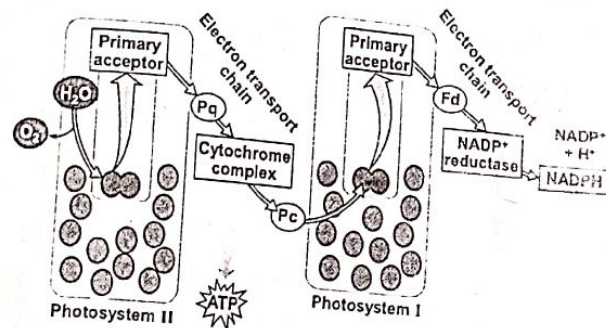
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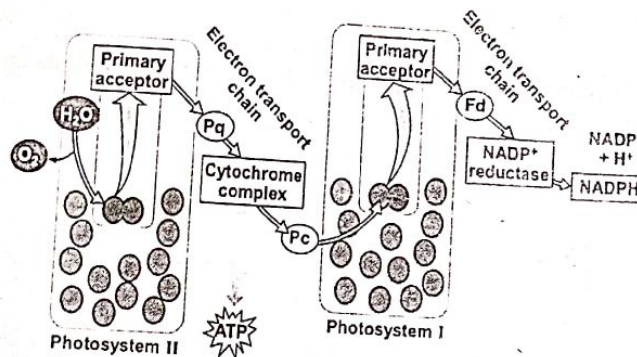
23. Photosystem II is involved in photolysis of water (as a result oxygen is evolved) If photosystem II is absent in an organism, oxygen will not be liberated.
24. The light reactions of photosynthesis take place at thylakoid membrane while dark reactions take place in stroma of chloroplast.
25. NADP+ acts as the final electron acceptor during non-cyclic electron flow, while electrons are moved back from ferredoxin to cytochrome complex to generate assimilating power via cyclic electron flow.
26. Each photon of light is able to excite a single electron during light reactions of photosynthesis.
- 27.



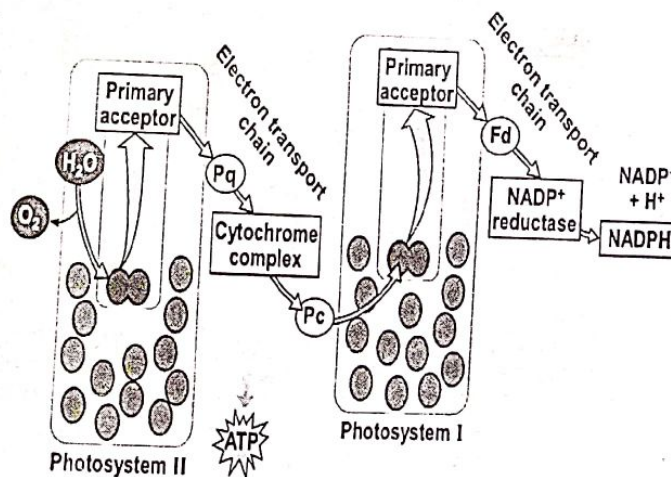
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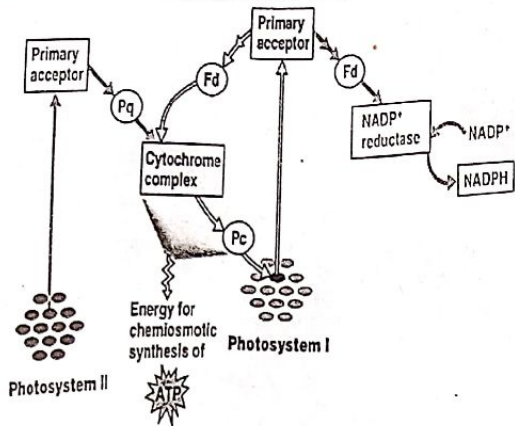
29.



30. Carbon dioxide fixation does not take place in light dependent phase of photosynthesis; rather its fixation occurs in light independent phase of photosynthesis.
- 31.

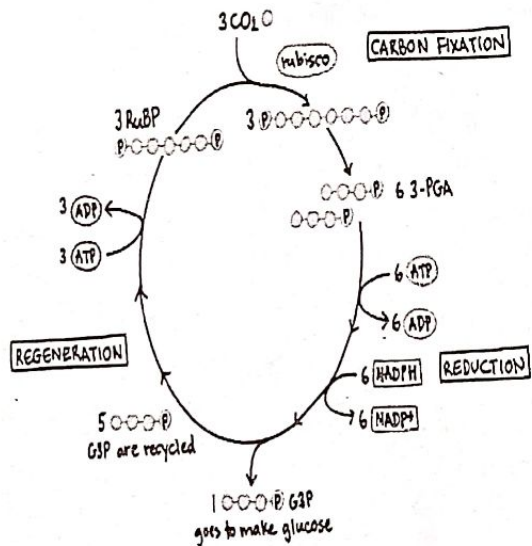


32. In this process electrons move in zigzag manner in electron carriers of membrane.



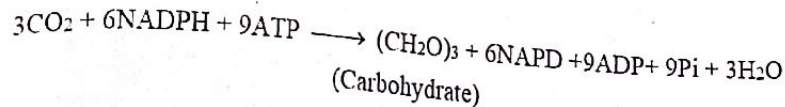
33. Z-scheme is another name use for light dependent reaction of photosynthesis because electrons move in zigzag fashion.

34.

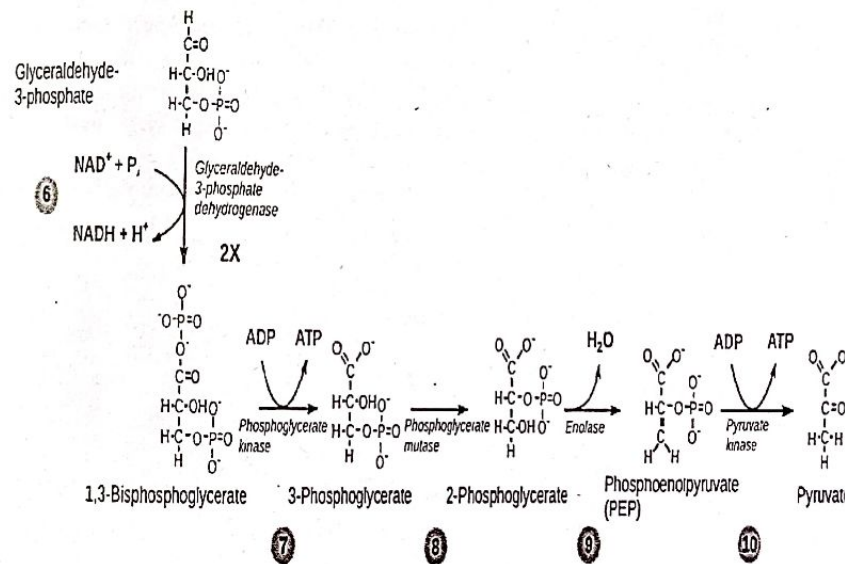


- 35. The production of ATP and O₂ as by product is associated with light reactions while CO₂ fixation is associated with dark reactions.
- 36. ATP and NADPH are the products of light dependent reactions of photosynthesis and these are used for production of trisaccharide known as Glyceraldehyde 3-phosphate.
- 37. Since 6 molecules of NADPH are used for the synthesis of 1 G3P in Calvin cycle, so for the synthesis of one glucose molecule that requires 2 G3P molecules, 12 molecules of NADPH are required.

- 38. Because the product of initial carbon fixation is a three - carbon compound, the Calvin cycle is also known as C₃ pathway
- 39. The chemical equation of dark reaction is:

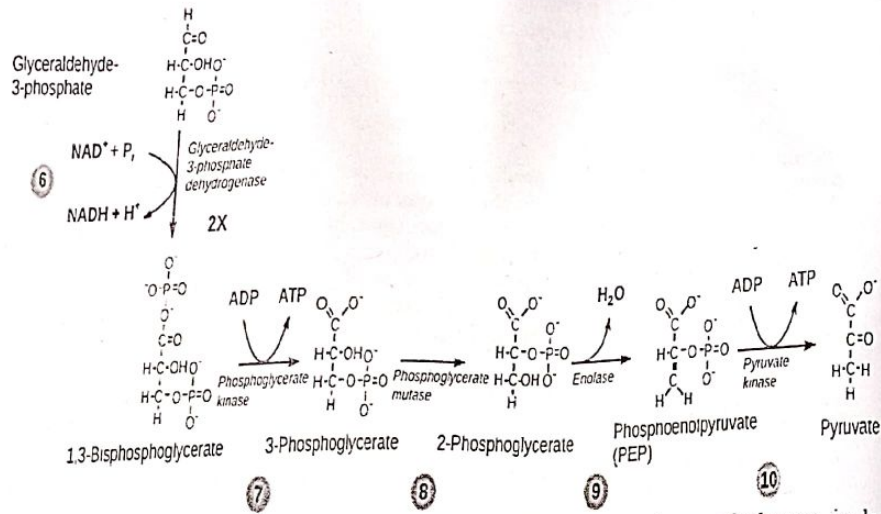


- 40. During glycolysis, NADH is produced. When cell cannot obtain oxygen, it converts pyruvate to either alcohol or lactic acid. In this process, NADH is oxidized.
- 41. Aerobic organisms use oxygen to produce energy for their metabolism. Almost all types of cells are adapted to do respiration without oxygen.
- 42. During anaerobic respiration, only 2% of energy of glucose molecule is extracted.
- 43. When yeast is deprived of oxygen, it starts anaerobic respiration. In this pathway, pyruvate that is formed from glucose is first converted to acetaldehyde. Finally, it is broken down to alcohol.
- 44. Cellular respiration is a process in which energy is released in the form of ATP due to catabolism of organic substance.
- 45. Glycolysis comprises of two phases. In 1st half, Glucose is converted into two 3 carbon compounds known as glyceraldehyde phosphate using 2 molecules of ATP in step wise reactions.
- 46. Energy is released during cellular respiration by catabolism of organic molecules in all organisms
- 47.

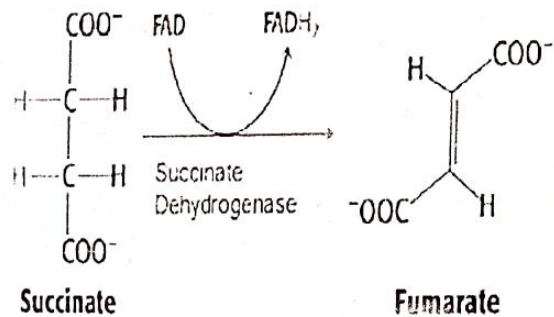


- 48. Removal of phosphate group from a molecule is called de-phosphorylation. Conversion of fructose 1,3-bisphosphoglycerate into 3-phosphoglycerate is a de-phosphorylation reaction.

49.

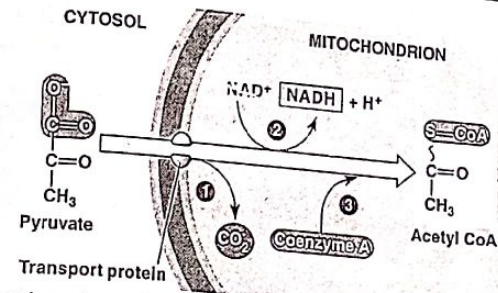


50. Total 40 ATP molecules are produced due to aerobic breakdown of glucose in both prokaryotes and eukaryotes. In prokaryotes 2 ATP are utilized in preparatory phase of glycolysis, so net ATP production is 38.
51. The oxidation of succinate into fumarate produces FADH₂. This reaction is catalyzed by an enzyme called succinic acid dehydrogenase.
52. The cyclic reactions of Krebs cycle produce both NADH and FADH₂, while in glycolysis, only NADH is produced. During electron transport chain, these NADH and FADH₂ molecules are oxidized to produce ATP molecules.
53. When products of glycolysis pass through Krebs cycle, it will produce 6 molecules of NADH, 2 molecules of FADH₂ and 2 molecules of ATP.
- 54.

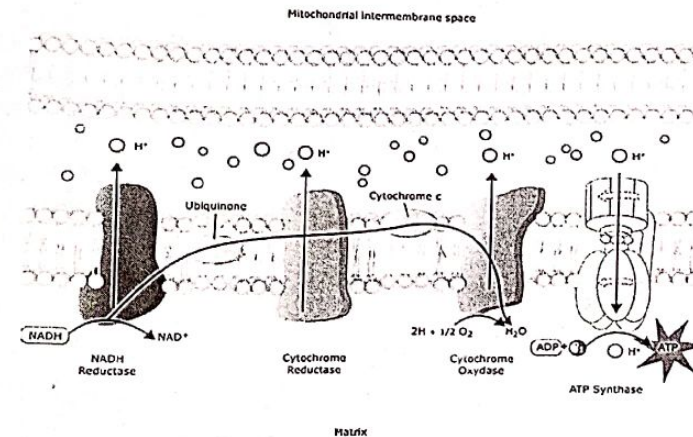


Theoretically, one NADH molecule generates 3 ATP molecules while one FADH₂ generates 2 ATP molecules during their oxidation through electron transport chain.

55.



56. Starting from end product of glycolysis, 3 times decarboxylation occurs. One molecule is produced during pyruvate oxidation while remaining 2 are produced during Krebs cycle. It means 3 molecules of CO₂ produced.
57. When pyruvate molecule is converted into acetyl CoA, one carbon of pyruvate is removed in the form of carbon dioxide (decarboxylation) along with hydrogen (dehydrogenation) that is added to NADH.
58. Biological oxidation involves the removal of hydrogen, a redox reaction catalyzed by the dehydrogenases, linked to a specific coenzyme.
59. The ATP molecules are produced during glycolysis via substrate level phosphorylation in cytosol while oxidative phosphorylation is associated with mitochondria. Photophosphorylation is the process of utilizing light energy from photosynthesis to convert ADP to ATP and is associated with chloroplasts.
60. Glycolysis results in pyruvate formation. It enters mitochondria where an enzyme pyruvate decarboxylase removes carbon dioxide from it. This decarboxylation results in formation of acetic acid.
61. In electron transport chain electrons moves through proteins named as electron carriers. Coenzyme Q reduces cytochrome b and then electrons are passed on to cytochrome c resulting in oxidation of cytochrome b.
- 62.



63. Passage of electrons between donor and acceptor in ETC releases energy, which is used to generate a proton gradient across the mitochondrial membrane by actively "pumping" protons into the inter-membrane space, producing a thermodynamic state that has the potential to do work.
64. R.B.Cs are unable to carry out oxidative phosphorylation because they lack mitochondria. Oxyntic cells, neurons and cardiac muscle cells are able to produce ATP molecules through oxidative phosphorylation because they have mitochondria.
65. Glycolysis produces 2 net ATP molecules, while link reaction produces only two NADH molecules. Krebs cycle produces 2 ATP molecules, 6 NADH and 2 FADH₂ molecules. These reduced electron carriers are then oxidized via E.T.C to generate maximum ATP molecules through chemiosmosis.
66. Chemiosmosis is the movement of ions across a semi-permeable membrane, down their electrochemical gradient. An example of this would be the generation of ATP by the movement of H⁺ across a membrane during cellular respiration or photosynthesis.
67. Phosphofructokinase is involved in process of glycolysis which results in production of ATP. When concentration of ATP is high, it binds with phosphofructokinase and inhibits its catalytic activity.
68. Citric acid results in high concentration of NADH. This increase inhibits catalytic activity of pyruvate decarboxylase leading to shut down of citric acid cycle.
69. G₃P is a trisaccharide and contains aldehyde group. It is formed as an intermediate compound during glycolysis and Calvin cycle.
70. Conversion of glucose phosphate from G₃P takes place in chloroplast and it is converted in to glucose, fructose, sucrose and eventually in starch.
71. Acetyl-CoA has two carbon atoms. When 18 carbon fatty acid I broken down, it produces 9 acetyl-CoA molecules.
72. Amino acid undergoes deamination in liver. This amino group become ammonia and this enters into urea cycle.

Introduction to Biological Molecules

- Q.1 The sum of all chemical reactions taking place within a cell is called:

A. Thermoregulation	B. Osmoregulation
C. Metabolism	D. Isomerism
- Q.2 Which one of the following is an example of anabolic process?

A. Respiration	B. Digestion
C. Photosynthesis	D. Both A and B
- Q.3 A mammalian cell contains 1.1 percentage:

A. Protein	B. Water
C. DNA	D. RNA
- Q.4 Most abundant organic compounds of a cell are:

A. Water	B. Proteins
C. Carbohydrates	D. Lipids

Importance of Water

- Q.5 Water is a very good solvent for substance due to its _____ nature and act as _____ due to its higher heat capacity.

A. Dipole nature, thermo-stabilizer	B. Polar, bipolar
C. Organic, inorganic	D. Ionic, covalent
- Q.6 Due to higher heat capacity and H-bonds, water acts as:

A. Thermo-stabilizer	B. Solvent
C. Inert medium	D. Reactive medium
- Q.7 The water molecules remain attached together and do not separate because of this bonding:

A. Non-covalent	B. Ionic
C. Hydrogen	D. Hydrophobic
- Q.8 Which property of water plays an important role in regulation of heat produced by oxidation?

A. Heat capacity	B. Heat of vaporization
C. Dipole nature	D. Ionization of water
- Q.9 If water has high latent heat of vaporization, how this property of water could be helpful to plants and animals? (MDCAT 2019)

A. With the release of large amount of water vapors, a small amount of heat loss can take place
B. No cooling effect with the release of even large amount of water vapors
C. It will keep their temperature very high
D. With the release of small amount of water vapors, a great amount of heat loss can take place
- Q.10 Which property of water helps to maintain the integrity of lipid membranes? (PMC 2020)

A. Specific heat capacity	B. Cohesion and adhesion
C. Hydrogen bonding	D. Hydrophobic exclusion

- Q.11 Water acts as universal solvent because of:
 A. Heat of vaporization
 B. High polarity
 C. Hydrogen bonding
 D. Cohesion and adhesion
- Q.12 Water acts as a temperature stabilizer for many organisms in the environment because of its:
 A. High surface tension
 B. Latent heat of vaporization
 C. High specific heat capacity
 D. Density
- Q.13 Ice floats on water due to which property of water:
 A. Low density
 B. Heat of vaporization
 C. Ionization
 D. Hydrophobic exclusion
- Carbohydrates**
- Q.14 Most abundant carbohydrate in nature is:
 A. Cellulose
 B. Polysaccharides
 C. Starch
 D. Glycogen
- Q.15 All of the following yield glucose on complete hydrolysis except:
 A. Starch
 B. Cellulose
 C. Glycogen
 D. Chitin
- Q.16 Glucose combines with _____ to form milk sugar.
 A. Glucose
 B. Galactose
 C. Fructose
 D. Mannose
- Q.17 Formation of a tri-saccharide involves release of _____ water molecule.
 A. 1
 B. 3
 C. 2
 D. 4
- Q.18 How many carbon atoms are present inside the ring of fructose?
 A. 6
 B. 5
 C. 4
 D. 3
- Q.19 Which of the following polysaccharide is present in human muscles abundantly?
 A. Myoglobin
 B. Actin and myosin
 C. Collagen
 D. Glycogen
- Q.20 Pick out the odd one:
 A. Cellulose
 B. Agar
 C. Galactose
 D. Pectin
- Q.21 Which of the following carbons are present outside the ring of fructose?
 A. 1st carbon & 2nd carbon
 B. Only 1st carbon
 C. 1st carbon and 5th carbon
 D. 1st carbon and 6th carbon
- Q.22 Which of the following sugars is the sweetest?
 A. Glucose
 B. Fructose
 C. Sucrose
 D. Maltose
- Q.23 In a disaccharide, if carbon atoms are 12 then how many OH groups will be present?
 A. 11
 B. 10
 C. 8
 D. 12
- Q.24 Which of the following is non-reducing disaccharide sugar?
 A. Mannose
 B. Sucrose
 C. Maltose
 D. Lactose
- Q.25 Which of the following sugar is mainly present in human blood?
 A. Glucose
 B. Sucrose
 C. Fructose
 D. Mannose

- Q.26 The simplest monosaccharide containing keto group is:
 A. Glyceraldehyde
 B. Glucose
 C. Dihydroxyacetone
 D. Ribose (MDCAT 2014)
- Q.27 The compounds which, on hydrolysis, yield polyhydroxy aldehyde or ketone subunits are:
 A. Lipids
 B. Polynucleotides
 C. Proteins
 D. Carbohydrates (MDCAT 2016)
- Q.28 Which of the following type of carbohydrates has high molecular weight and is sparingly soluble in water?
 A. Monosaccharide
 B. Oligosaccharides
 C. Disaccharides
 D. Polysaccharides (MDCAT 2017)
- Q.29 Glycosidic bond is formed by the:
 A. Removal of water
 B. Removal of oxygen
 C. Addition of oxygen
 D. Addition of water (MDCAT 2018)
- Q.30 Starch is present in tuber, fruits and grains but absent in animal cells. Instead animals have a substance stored in liver and muscles known as:
 A. Glucose
 B. Galactose
 C. Glycogen
 D. Glucagon (MDCAT 2019)
- Q.31 The covalent bond or bridge between two monosaccharides to form a disaccharide is called a:
 A. Carboxyl bond
 B. Hydrogen bond
 C. Hydroxyl bond
 D. Glycosidic bond (MDCAT 2019)
- Q.32 Which is an example of a disaccharide?
 A. Lactose
 B. Starch
 C. Glycogen
 D. Fructose (MDCAT 2019)
- Q.33 _____ is stored in animal cells.
 A. Starch
 B. Cellulose
 C. Sucrose
 D. Glycogen (ETEA 2019)
- Q.34 The bond that is formed between two monosaccharide units is called:
 A. Ionic bond
 B. Hydrogen bond
 C. Peptide bond
 D. Glycosidic bond (ETEA 2019)
- Q.35 Pure form of cellulose is:
 A. Cotton
 B. Chitin
 C. Cellophane
 D. Paper (AJK 2019)
- Q.36 The best example of polysaccharide which is stored in animals is called:
 A. Lactose
 B. Cellulose
 C. Sucrose
 D. Glycogen (AJK 2019)
- Q.37 $C_5H_{10}O_4$ is the formula of _____.
 A. Deoxyribose sugar
 B. RNA
 C. DNA
 D. ATP (AJK 2019)
- Q.38 _____ is the storage form of carbohydrates in animals and humans which is equivalent to the _____ in plants.
 A. Glycogen, cellulose
 B. Starch, cellulose
 C. Starch, glycogen
 D. Glycogen, starch

PMC Topic-3

Biological Molecules

(PMC 2020)

- Q.39 Monosaccharides have a general formula represented by:
 A. $C_n(H_2O)_n$ B. $C_2(H_2O)_n$
 C. $C(H_2O)_n$ D. $C_1(H_2O)_n$
- Q.40 _____ are the major sites for the storage of glycogen in an animal's body. (MDCAT 2017)
 A. Muscle and liver B. Around belly and hips
 C. Around thighs and belly D. Liver and kidneys (ETEA 2019)
- Q.41 Chitin is a:
 A. Lipoprotein B. Polysaccharide
 C. Glycoprotein D. Phospholipid
- Q.42 Which of the following are instant source of energy in living organisms, like glucose? Their general formula is: (NUMS 2019)
 A. $C_x(H_2O)_y$ B. $C_xH_{12}O_6$
 C. $C_x(H_2O)_x$ D. $C_x(HO)_y$
- Q.43 All are characteristics of monosaccharides except:
 A. All carbon contain OH except carbonyl carbon
 B. Digestion by amylase enzyme
 C. Primary product of photosynthesis
 D. Very simple and very sweet in taste
- Q.44 Which of the followings sugars is/are component of nucleic acid?
 A. Tetroses B. Trioses
 C. Pentoses D. Hexoses

Proteins

- Q.45 How many types of amino acids are present in the cell?
 A. 170 B. 25
 C. 20 D. 3000
- Q.46 A globular protein consisting of more than one polypeptide chains has:
 A. Primary structure B. Tertiary structure
 C. Secondary structure D. Quaternary structure
- Q.47 A protein having secondary structure possesses:
 A. Hydrogen bonding B. Peptide bond
 C. Disulfide bond D. Both A and B
- Q.48 All of the following are examples of fibrous proteins except:
 A. Silk fiber B. Myoglobin
 C. Keratin D. Fibrin
- Q.49 Which of the following is a complex of globular protein with non-proteinaceous material?
 A. Collagen B. Fibrinogen
 C. Albumin D. Haemoglobin
- Q.50 Muscle haemoglobin possesses:
 A. Primary structure B. Tertiary structure
 C. Secondary structure D. Quaternary structure
- Q.51 _____ are defensive proteins.
 A. Antigens B. Vaccines
 C. Antibodies D. Fibrinogen

PMC Topic-3

Biological Molecules

- Q.52 Proteins of hair, horns, feathers and other skin parts are:
 A. Storage protein B. Structural protein
 C. Enzymatic protein D. Hormonal protein
- Q.53 Identify the protein, which cannot be crystallized.
 A. Antibodies B. Haemoglobin
 C. Fibrin D. Enzymes
- Q.54 How many peptide bonds are present in an insulin molecule?
 A. 49 B. 50
 C. 51 D. 48
- Q.55 Usually a polypeptide chain bends and folds upon itself to form a globular shape. This is protein's:
 A. Primary conformation B. Tertiary conformation
 C. Secondary conformation D. Quaternary conformation
- Q.56 Which level of protein structure maintains the helix shape of enzymes? (LUMHS 2014)
 A. Primary B. Secondary
 C. Tertiary D. Quaternary
 E. A and B
- Q.57 Which one of the following is used in synthesis of nucleic acid, hormones, co-enzyme and amino acid for protein synthesis? (KMDC 2014)
 A. Carbon B. Hydrogen
 C. Oxygen D. Nitrogen
- Q.58 Enzymes are molecules of one of the following group of biomolecules. Mark the correct answer which can also be defined as a biological catalyst: (KMDC 2014)
 A. Protein B. Fats
 C. Carbohydrate D. Vitamins
- Q.59 Which molecular structure of enzyme is essential for activity of enzyme? (MDCAT 2015)
 A. Primary structure B. Secondary structure
 C. Quaternary structure D. Tertiary structure
- Q.60 Secondary structure of protein is found in: (MDCAT 2016)
 A. Trypsin B. Insulin
 C. Keratin D. Glucagon
- Q.61 The number of amino acids that have been found to occur in cells and tissues are: (MDCAT 2017)
 A. 170 B. 25
 C. 20 D. 45
- Q.62 Most proteins are made up of type of amino acid: (MDCAT 2017)
 A. 20 B. 25
 C. 170 D. 200
- Q.63 Backbone of amino acid comprises of: (MDCAT 2017)
 A. C-C-N B. $-NH_2$ Group
 C. $-COOH$ group D. $-H$ group
- Q.64 Bonds present in alpha helix are: (MDCAT 2017)
 A. Hydrogen bonds B. Ionic bonds
 C. Disulphide linkage D. Peptide bonds

PMC Topic-3

Biological Molecules

- Q.65 Sequence of amino acids is important in:
 A. Primary structure
 B. Tertiary structure
 C. Secondary structure
 D. Quaternary structure (MDCAT 2018)
- Q.66 Which of the following holds the alpha helix of protein in its place?
 A. Hydrogen bond
 B. R-group
 C. Amino group
 D. Disulphide bond (MDCAT 2018)
- Q.67 The number and sequence of amino acids along a polypeptide chain is called structure of a protein.
 A. Secondary
 B. Primary
 C. Quaternary
 D. Tertiary (MDCAT 2019)
- Q.68 Most proteins are made up of:
 A. 16 types of amino acids
 B. 170 types of amino acids
 C. 10 types of amino acids
 D. 20 types of amino acids (MDCAT 2019)
- Q.69 The structure of a fibrous protein comprises of polypeptide chains in the form of:
 A. Cluster
 B. Spherical or curled up ball
 C. Flat uncoiled chains
 D. Long strands or fibrils (MDCAT 2019)
- Q.70 In glycine, 'R' is _____.
 A. Fatty acid
 B. Hydrogen
 C. Ethane
 D. Methane (MDCAT 2019)
- Q.71 The number and sequence of amino acids in a polypeptide chain is known as its _____.
 A. Primary structure
 B. Tertiary structure
 C. Secondary structure
 D. Quaternary structure (AJK 2019)
- Q.72 Which type of bonds is required to maintain the alpha helix configuration of a protein?
 A. Hydrophobic interactions
 B. Disulfide bonds
 C. Hydrogen bonds
 D. Ionic bonds (AJK 2019)
- Q.73 The structure given below is the constituent part of:
 (NUMS 2019)
- $$\begin{array}{c} \text{R} \\ | \\ \text{H}_2\text{N} - \text{C}_\alpha - \text{COOH} \\ | \\ \text{H} \end{array}$$
- A. Lipids
 B. Carbohydrates
 C. Vitamins
 D. Proteins
- Q.74 Which of the following is a protease?
 A. Deaminase
 B. Rennin
 C. Oxidase
 D. Catalase
- Lipids**
- Q.75 It is an amino acid and also a part of phospholipid:
 A. Serine
 B. Ethanolamine
 C. Choline
 D. Aspartic acid
- Q.76 Myelin sheath of neuron is composed of:
 A. Sphingolipids
 B. Ethanolamine
 C. Choline
 D. Waxes

PMC Topic-3

Biological Molecules

- Q.77 How many double bond/s is/are present in R-group of oleic acid?
 A. 4
 B. 2
 C. 6
 D. 1
- Q.78 Which of following cannot form a biopolymer?
 A. Amino acid
 B. Nucleotides
 C. Fatty acid
 D. Monosaccharides
- Q.79 If in lipids there is a higher proportion of unsaturated fatty acid, then it will be:
 A. Oils
 B. Phenols
 C. Waxes
 D. Fats (MDCAT 2017)
- Q.80 Which of the following is an unsaturated fatty acid?
 A. Butyric acid
 B. Oleic acid
 C. Stearic acid
 D. Palmitic acid (MDCAT 2018, PMC 2020)
- Q.81 Sara is a chemistry student who is carrying out an experiment between an alcohol and acetic acid in the laboratory. The product formed at the end of the experiment will be:
 A. Glucose and oxygen
 B. An ester and water molecule
 C. Glycogen and water molecule
 D. Glycerol and Sulfuric acid (MDCAT 2019)
- Q.82 Lipids contain double amount of energy as compared to the same amount of carbohydrates due to the presence of:
 A. Lower proportion of C-H bonds
 B. Higher proportion of C-O bonds
 C. Higher proportion of C-H bonds
 D. Higher proportion of oxygen (MDCAT 2019)
- Q.83 Lipids are organic molecules which are insoluble in:
 A. Alcohol
 B. Ether
 C. Chloroform
 D. Water (AJK 2019)
- Q.84 What type of linkage is formed when an alcohol and an acid react?
 A. Hydrogen bond
 B. Peptide bond
 C. Glycosidic linkage
 D. Ester bond (AJK 2019)
- Q.85 Lipids store double amount of energy as compared to carbohydrates because of:
 A. High proportion of oxygen
 B. Low proportion of carbon
 C. High CO ratio
 D. High proportion of CH (PMC 2020)
- Q.86 The head of phospholipid molecule is polar (hydrophilic) due to:
 A. Fatty acid
 B. Phosphate
 C. Carboxylic acid
 D. Triacylglycerol (AJK 2019)
- Q.87 Which of the following are the most prominent part of cell membranes in living organisms?
 A. Terpenoids
 B. Waxes
 C. Phospholipids
 D. Acylglycerols (NUMS 2019)
- Q.88 An organic compound that belongs to lipids:
 A. C₁₈H₃₂O₁₆
 B. C₅₇H₁₁₀O₆
 C. C₃₀₀H₅₀₀O₂₅₀
 D. C₄₂H₈₅O₂₃N₁₇S
- Q.89 It is precursor of bile acids:
 A. Waxes
 B. Phospholipids
 C. Steroids
 D. Acylglycerol
- Q.90 Lipase can hydrolyze them:
 A. Triglycerides
 B. Terpenoids
 C. Waxes
 D. All of these

Nucleic Acids

- Q.91 All of the following biomolecules are nutritious except:
 A. Carbohydrates
 B. Lipids
 C. Proteins
 D. Nucleic acids
- Q.92 It contains nitrogenous base:
 A. Glycogen
 B. Cellulose
 C. ATP
 D. Haemoglobin
- Q.93 Nucleo-histones are present in:
 A. Lysosome
 B. Ribosomes
 C. Chromosomes
 D. Mitochondria (MDCAT 2016)
- Q.94 Phosphodiester bond is:
 A. P—O—C—P—O—C
 B. C—O—P—O—C
 C. C—O—P
 D. C—C—O—P (NUMS 2019)
- Q.95 Which of the following is the constituent of RNA molecule?
 A. Fatty acids
 B. Ribonucleic acid
 C. Ascorbic acid
 D. Deoxyribonucleic acid
- Q.96 Type of RNA that is used to start process of replication in prokaryotic cell:
 A. tRNA
 B. rRNA
 C. mRNA
 D. Primers
- Q.97 Which of the following type of RNA is catalytic in nature?
 A. tRNA
 B. rRNA
 C. mRNA
 D. Ribozyme

Conjugated molecules (Glycolipids, Glycoproteins)

- Q.98 Conjugated histone proteins are:
 A. Structural and regulatory
 B. Regulatory only
 C. Structure only
 D. Transport proteins
- Q.99 All of the following are conjugated molecules except:
 A. Glycolipids
 B. Nucleoproteins
 C. Glycoproteins
 D. Phospholipids
- Q.100 Most of the cellular secretions are:
 A. Glycolipids
 B. Lipoproteins
 C. Glycoproteins
 D. Nucleoproteins
- Q.101 Type of conjugated molecules present in ribosomes:
 A. Glycolipids
 B. Nucleoprotein
 C. Glycolipids
 D. Lipoproteins

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

1	C	16	B	31	D	46	D	61	A	76	A	91	D
2	C	17	C	32	A	47	D	62	A	77	D	92	C
3	D	18	C	33	D	48	B	63	A	78	C	93	C
4	B	19	D	34	D	49	D	64	A	79	A	94	B
5	A	20	C	35	A	50	B	65	A	80	B	95	B
6	A	21	D	36	D	51	C	66	A	81	B	96	D
7	C	22	B	37	A	52	B	67	B	82	C	97	D
8	B	23	C	38	D	53	C	68	D	83	D	98	A
9	D	24	B	39	A	54	A	69	D	84	D	99	D
10	D	25	A	40	A	55	B	70	B	85	D	100	C
11	B	26	C	41	B	56	B	71	A	86	B	101	B
12	C	27	D	42	A	57	A	72	C	87	C		
13	A	28	D	43	B	58	A	73	D	88	B		
14	A	29	A	44	C	59	D	74	B	89	C		
15	D	30	C	45	A	60	C	75	A	90	A		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

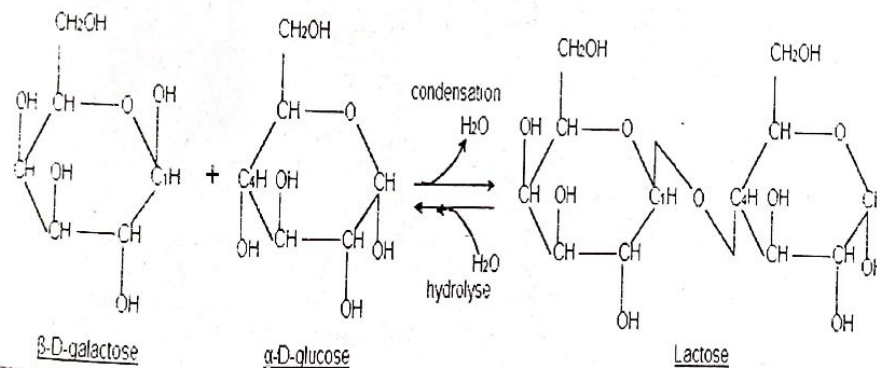
- Word metabolism is derived from Greek word which means "Change". Temperature regulation, water and salt regulation respectively called thermoregulation and osmoregulation, while isomerism is the phenomenon in which more than one compounds have the same chemical formula but different structures.

Process	Definition	Example	Energy relation
Anabolism	Formation of larger molecules from smaller one	Photosynthesis	Energy absorbed
Catabolism	Breakdown of larger molecules into smaller	Respiration & digestion	Energy released

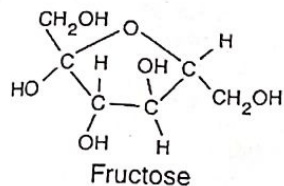
Sr. No.	Chemical Components	% total cell weight	
		Bacterial Cell	Mammalian Cell
1.	Water	70	70
2.	Proteins	15	18
3.	Carbohydrates	3	4
4.	Lipids	2	3
5.	DNA	1	0.25
6.	RNA	6	1.1
7.	Organic molecules (enzymes, hormones, metabolites)	2	2
8.	Inorganic ions (Na ⁺ , K ⁺ , Mg ⁺² , Cl ⁻ , SO ₄ ⁻² etc.)	1	1

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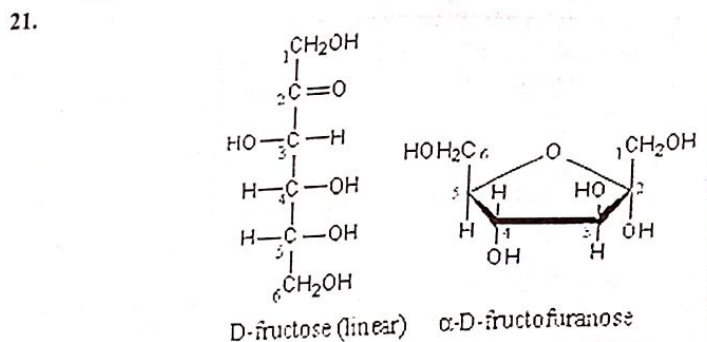
- Water is an excellent solvent for polar substances due to its dipole nature. Ions and molecules move randomly and are in a more favorable state to react with other molecules and capacity and act as thermo-stabilizer. Water has great ability to absorb heat due to higher heat capacity and act as thermo-stabilizer.
- higher heat capacity and act as thermo-stabilizer.
- The sticking together of like substances is called cohesion. Depending on how attracted molecules of the same substance are to one another, the substance will be more or less cohesive. Hydrogen bonds cause water to be exceptionally attracted to each other. Therefore, water is very cohesive.
- Evaporation causes cooling because the process requires heat energy. The energy is taken away by the molecules when they convert from liquid into gas, and this causes cooling on the original surface.
- Water absorbs much heat as it changes from liquid to gas and causes cooling effect. Evaporation of only two ml out of one liter of water lowers the temperature of the remaining 998 ml by 1°C.
- When a hydrophobic molecule is dropped in an aqueous medium, hydrogen bonds between water molecules will be broken to make room for the hydrophobic molecule; however, water molecules do not react with hydrophobic molecule. This is considered an endothermic reaction, because when bonds are broken heat is put into the system.
- A solvent is simply a substance that can dissolve other molecules and compounds, which are known as solutes. Because of its polarity and ability to form hydrogen bonds, water makes an excellent solvent, meaning that it can dissolve different kinds of molecules.
- Due to presence of hydrogen bonding in water molecule it acts as temperature stabilizer of many organisms in the environment.
- Ice is less dense than water because during ice formation water molecules rearrange themselves in hexagonal form, this increases the volume of ice crystals, hence decrease its density.
- Cellulose is a type of polysaccharide which contains chains of glucose rings providing strength and rigidity. Cellulose forms the cell walls of plants and is the primary constituent of wood, making this organic compound, the most abundant one on the surface of the Earth.
- Chitin is a nitrogen containing polysaccharide and it will yield N-acetyl-D-glucosamine on hydrolysis while starch and glycogen will yield α-D glucose monomers and Cellulose will yield β-D glucose monomers on hydrolysis.



17. Tri-saccharide is a molecule containing three monosaccharides, there is single glycosidic bond between two adjacent monosaccharides and third monosaccharide will bind to already bound disaccharide by forming another glycosidic bond. Thus there will be two glycosidic bonds and one water molecule will be released from each glycosidic bond.
18. Four carbon atoms are present inside the ring of fructose while two carbon atoms are present outside of the ring.

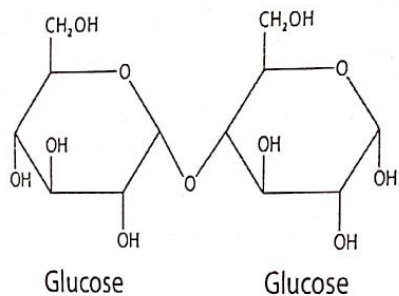


19. Glycogen is most abundant polysaccharide present in human muscles and liver while myoglobin, collagen, actin and myosin are proteins.
20. Cellulose, agar and pectin are the examples of polysaccharides but galactose is an example of monosaccharide.

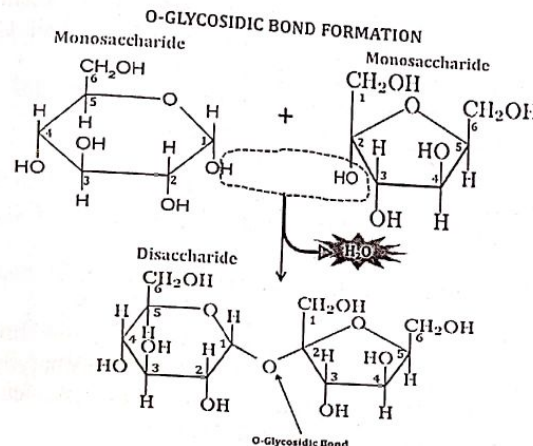


22. Fructose has ketone functional group which gives sweet taste when dissolved in water.
- 23.

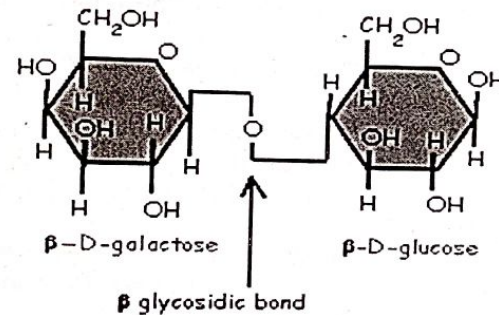
Maltose



24. The reducing group in sucrose is used in glycosidic bond formation due to which it is non-reducing in nature. On the other hand, mannose, maltose and lactose are all reducing sugars.
25. In non-diabetic individuals, the concentration of glucose in the blood is about 0.08%.
26. Glyceraldehyde, ribose and glucose are simple three carbon sugars containing aldo group while dihydroxyacetone are simplest three carbon sugars containing keto group while Carbohydrates are polyhydroxy aldehydes or ketones or complex substances which on hydrolysis yield polyhydroxy aldehyde or ketone sub-units. Proteins are polymers of amino polynucleotide chain is made up of nucleotide.
27. Lipids are heterogeneous group of compounds related to fatty acid while Polysaccharides are made up of many monosaccharides subunits and have higher molecular weight as compared to monosaccharides and oligosaccharides. Polysaccharides are sparingly soluble in water while monosaccharide are highly soluble.
- 28.
- 29.

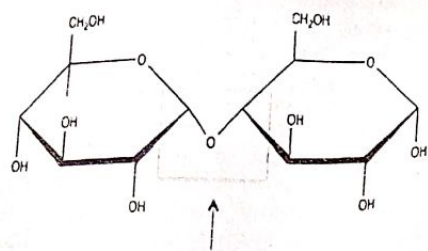


30. Glycogen is animal starch found in liver and muscle cell while starch is stored in plants cells.
- 31.



32. Glycogen and starch are examples of polysaccharides while fructose is an example of monosaccharide.
33. Starch is a storage form of polysaccharides in plants while glycogen is a storage form of carbohydrates in animal cells. Cellulose is present in cell wall.

34.

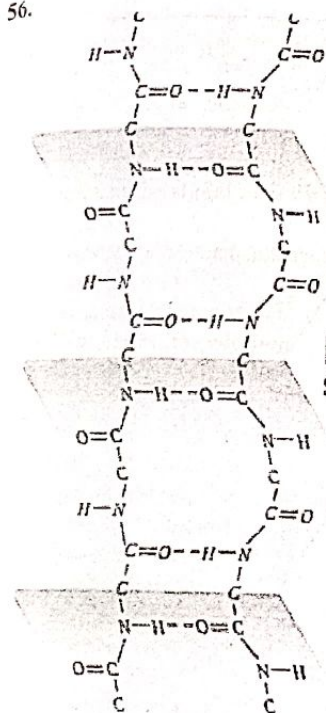


Glycosidic Bond

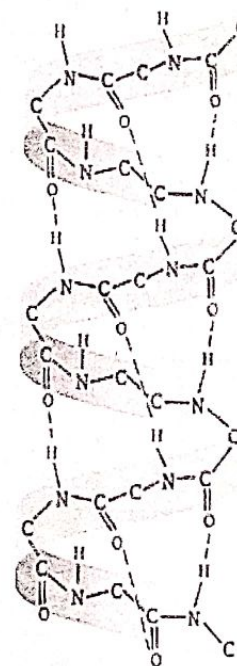
35. Cellulose is the most abundantly present polysaccharide. It is present in plants cell wall. Chitin is also a polysaccharide which is present in fungi cell wall. Cellophane is a thin, transparent sheet made of regenerated cellulose.
36. Glycogen is a storage polysaccharide in animals liver and muscles cells. Cellulose is a structure polysaccharide. Lactose and sucrose are disaccharides.
37. Formula of ribose is $C_5H_{10}O_5$.
38. Glycogen and starch are storage forms of carbohydrates in animals and plants respectively.
39. General formula of monosaccharides is $C_n(H_2O)_n$ as number of carbon and oxygen is usually same in monosaccharides.
40. Glycogen is called as animal starch and it is abundantly found in muscle and liver cells of animal tissue.
41. Lipoproteins and glycoproteins are conjugated molecules; phospholipids are class of lipids that form basic structure of biological membrane. Chitin is only polysaccharide that contain nitrogen, and it is component of fungal cell wall as well as exoskeleton of insects.
42. $CX(H_2O)Y$ is the general formula of all carbohydrates.
43. Amylase is an enzyme that hydrolyzes polysaccharides like starch and glycogen. It does not break down monosaccharides like glucose, fructose etc.
44. The single repeating unit of nucleic acids is nucleotide and it has three components. i) Phosphate group, ii) Nitrogen bases and iii) Pentose sugar such as ribose and deoxyribose.
45.
 - 170 amino acids are present in nature in cells or tissues.
 - 25 types of amino acid are constituents of proteins.
 - The combinations of 20 types of amino acids can synthesize most of the proteins.
46. In many complex proteins, polypeptide tertiary chains are aggregated and held together by hydrophobic interactions, hydrogen and ionic binds. This specific arrangement is the quaternary structure.
47. All proteins have primary structure; amino acids are joined with each other through peptide bonds. In secondary structure, polypeptide chain coils to form either α -helix or β -pleated sheet or both through hydrogen bonds.
48. Silk fiber, keratin and fibrin are examples of fibrous proteins while myoglobin has tertiary structure and it is a typical water-soluble globular protein found in muscles.
49. Hemoglobin consists of 4 polypeptide chains forming a quaternary structure, and 4 haem groups containing 4 iron atoms as a non-protein part of the molecule.

50. Myoglobin, also called as muscle haemoglobin, is made up of single polypeptide chain, which coils upon itself forming tertiary structure. Antibodies are also called immunoglobulins; they are the part of immune system and protect body against invading pathogens. Usually fibrous proteins containing secondary structure are structural proteins.
51. Fibrin is an example of fibrous protein and cannot be crystallized. Antibodies, hemoglobin and enzymes are globular proteins and can be crystallized.
52. There are two polypeptide chains in insulin. One containing 21 amino acids and the other containing 30 amino acids. The bond between each chain is one less than the total number of the amino acids. In this way number of peptide bonds will be 49 out of 51 amino acids.
53. When a single polypeptide chain folds upon itself and form globular structure, it is tertiary structure of the proteins. Three types of bonds, namely ionic, hydrogen and disulfide maintain it.

56.



β -pleated sheet



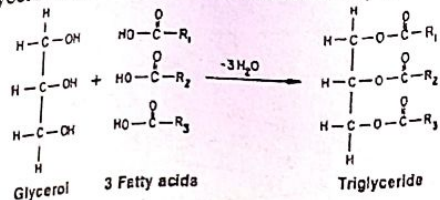
α helix

57. Carbon is the backbone of all the biological molecules.
58. Most enzymes are proteins in nature which are used as a biological catalyst.
59. Globular structure of enzyme has very important role in its activity and this globular structure attains at least tertiary level structure.
60. Keratin is a fibrous protein having secondary structure and mostly found in nails and hairs. Trypsin is a protease while insulin and glucagon are the hormones and all are globular proteins.
61. About 170 types of amino acids have been found to occur in cells and tissues. Of these, about 25 are constituents of proteins. Most of the proteins are, however, made of 20 types of amino acids.

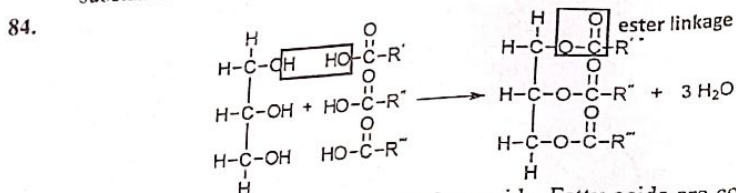
PMC Topic-3

Biological Molecules

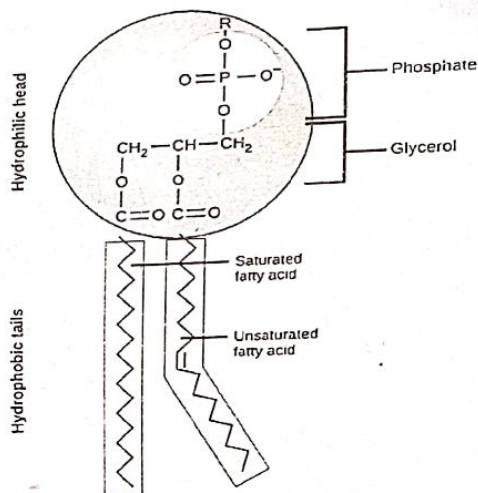
79. Fats containing unsaturated fatty acids are usually liquid at room temperature and are said to be oils. Fats containing saturated fatty acids are solids.
80. Butyric acid, Palmitic acid and Stearic acids examples of saturated fatty acids. Oleic acid is an example of mono-unsaturated fatty acid and has double bond between C9 and C10.
81. Chemically, acylglycerols can be defined as esters of fatty acids and alcohol.



82. C-H bond is potential source of energy. Lipids have higher proportion of C-H bonds as compare to carbohydrates and proteins.
83. Due to non-polar nature lipids are only solubilized in non-polar substances. Water is a polar substance.



85. Lipids are used as energy storage via fatty acids. Fatty acids are composed of carboxylic acids attached to long chains of hydrocarbons. So percentage of C---H bonds in lipids is much higher.
- 86.

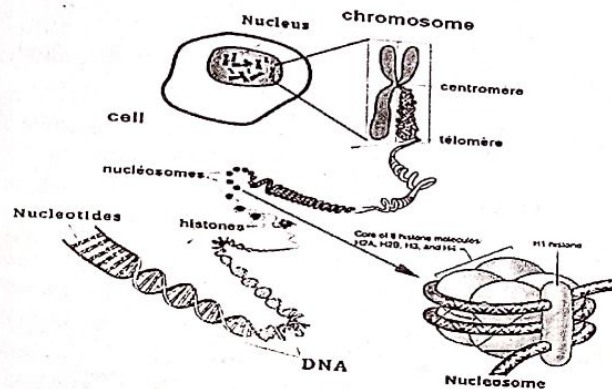


87. Basic structure of cell membrane is formed by phospholipids.

PMC Topic-3

Biological Molecules

88. Lipids are organic compounds that have very less amount of oxygen as compared to other elements like carbon and hydrogen.
89. Steroids include bile acids, male sex hormone, female sex hormone and progesterone etc.
90. Triglycerides are hydrolyzed into fatty acids and glycerols by an enzyme known as lipase. These are only types of lipids that break down in animal body by an enzyme and provide energy source.
91. Through metabolism carbohydrates, lipids and proteins all can be the source of energy, while nucleic acids are not the source of energy.
92. ATP is a nucleotide which contains pentose sugar, nitrogenous base and three phosphate groups. Glycogen and cellulose are polysaccharides and hemoglobin is a quaternary protein.
- 93.



94. The bond between two nucleotides is called Phosphodiester bond and it is formed between phosphate group of one nucleotide attach at carbon 5 of pentose sugar with hydroxyl group of 3 carbon of pentose sugar of another nucleotide.
95. **Ribonucleic acid (RNA)** is a molecule similar to DNA. Unlike DNA, RNA is single-stranded. An RNA strand has a backbone made of alternating sugar (ribose) and phosphate groups. Attached to each sugar is one of four bases; adenine (A), uracil (U), cytosine (C), or guanine (G).
96. Ten RNA nucleotides are stringed together to form a primer. Polymerase enzyme recognizes these RNA nucleotides known as primer and start process of replication in prokaryotes.
97. Mostly enzymes are protein in nature but there is special type of RNA that has ability to catalyze reactions. This type is known as Ribozyme.
98. Histones are the chief protein components of chromatin, acting as spools around which DNA winds, and playing a role in gene regulation. Without histones, the unwound DNA in chromosomes would be very long.
99. Two different molecules belonging to different categories, usually combine together to form conjugated molecules.
100. The Golgi apparatus is responsible for cellular secretion. When protein vesicles move to Golgi apparatus for delivery to targeted destinations. As the secretory proteins move through the Golgi apparatus, a number of chemical modifications like Glycosylation may occur.
101. Ribosomes are combination of RNA (Nucleic acid) and proteins (Nucleoprotein)

4 CELL STRUCTURE AND FUNCTION

TOPIC PRACTICE EXERCISE

TOPIC-WISE MCQs

Introduction to Cell

- Q.1 Cell theory is not applicable to:
 A. Fungi
 B. Bacteria
 C. Algae
 D. Virus
- Q.2 What would be the resolving power of the objective length in a microscope, if the eyepiece is of 10X and total magnification is 40X?
 A. 4X
 B. 10X
 C. 40X
 D. 400X
- Q.3 The human naked eye can differentiate between two points which are how much apart?
 A. 1 mm
 B. 0.1 mm
 C. 2 dm
 D. 1 dm
- Q.4 What is the correct sequence of steps in cell fractionation?
 A. Homogenization, centrifugation, separation
 B. Separation, homogenization, centrifugation
 C. Centrifugation, homogenization, separation
 D. Homogenization, separation, centrifugation

Compare the Structure of Typical Plant and Animal Cell

- Q.5 Plant cells are distinguishable from animal cells in containing:
 A. Mitochondria
 B. Endoplasmic reticulum
 C. Ribosomes
 D. Cell wall
- Q.6 Pick the correct one with reference to plant cell:

	Mitochondria	Peroxisome	Centrioles
A	✓	×	✓
B	✓	✓	×
C	×	✓	✓
D	×	✓	×

- Q.7 Out of the given options, choose the one which shows the structures found only in plants?
 (MDCAT 2016)
 A. Vacuole, chloroplast, ribosomes
 B. Chloroplast, cell wall, large vacuole
 C. Chloroplast, microtubules, peroxisomes
 D. Chloroplast, cell wall, mitochondria
- Q.8 Which features do animal cells share with plant cells?
 (NTS 2017)

	Chloroplast	Cytoplasm	Nucleus	Mitochondria
A.	✓	✓	✓	✓
B.	✓	×	✓	×
C.	×	✓	✓	✓
D.	×	×	×	✓

PMC Topic-4

Cell Structure and Function

Cell Wall

- Q.9 The layers of cellulosic fibers in cell wall are arranged with each other at:
 A. Obtuse angle
 B. Parallel angle
 C. Right angle
 D. Horizontal angle
- Q.10 Which of the following is related to prokaryotic cell wall?
 A. Murein
 B. Sacculus
 C. Peptidoglycan
 D. All A, B, C
- Q.11 It is absent in secondary cell wall:
 A. Silica
 B. Pectin
 C. Waxes
 D. Cutin
- Q.12 In which type of cells, cell wall is not present:
 A. Plant cells
 B. Bacterial cells
 C. Fungal cells
 D. Liver cells
- Q.13 Cellulose is usually not found in:
 A. Primary cell wall
 B. Secondary cell wall
 C. Middle lamella
 D. All contain cellulose
- Q.14 Holding neighboring cells together is function of:
 A. Primary cell wall
 B. Secondary cell wall
 C. Middle lamella
 D. None of these

(PMC 2020)

Plasma Membrane

- Q.15 All of following are common molecules in membrane of all type of cells except:
 A. Globular protein
 B. Traces of carbohydrates
 C. Cholesterol
 D. Phospholipid
- Q.16 Hydrophobic portion of plasma membrane is present in/at:
 A. Towards extracellular matrix
 B. Inner core of plasma membrane
 C. Towards cytoplasm
 D. Towards the cytoskeleton
- Q.17 Which of the following describes the fluid mosaic model of plasma membrane structure?
 A. Phospholipid monolayer with embedded proteins
 B. Phospholipid bilayer with embedded proteins
 C. Triglyceride bilayer with embedded proteins
 D. Triglyceride monolayer with embedded proteins
- Q.18 In plasma membrane, carbohydrates combine with the lipids and proteins to form glycolipids and glycoproteins and are oriented:
 A. Towards inside
 B. Towards inside and outside
 C. Towards outside
 D. Randomly distributed
- Q.19 Which of the following is not a characteristic feature of animal cell membrane?
 A. Provides mechanical shape
 B. Regulate passage of molecules
 C. Maintain cellular homeostasis
 D. Prevent from osmotic lysis
- Q.20 Which of the following acts as receptor site on plasma membrane?
 A. Head of phospholipid molecules
 B. Tail of phospholipid molecules
 C. Cholesterol molecules
 D. Glycoprotein
- Q.21 Which structure is the most important for cellular life?
 A. Nucleus
 B. Cell membrane
 C. Chromosome
 D. Mitochondria

PMC Topic-4

Cell Structure and Function
(MDCAT 2014)

- Q.22 The intake of liquid materials across the cell membrane is:
 A. Phagocytosis
 B. Pinocytosis
 C. Endocytosis
 D. Exocytosis
- Q.23 Which substance from the following is important for the mechanical stability of cell membranes, as without it membranes quickly break and cells burst open? The hydrophobic region of these molecules help to prevent ion or polar molecules from passing through the cell membrane?
 A. Protein
 B. Phospholipids
 C. Glycolipids
 D. Cholesterol
 (KMDC 2014)
- Q.24 Fluid mosaic model of plasma membrane states that protein molecules float in a fluid like _____ layer.
 A. Galactose
 B. Glucose
 C. Phospholipid
 D. Carbohydrate
 (MDCAT 2015)
- Q.25 The rapid exchange of materials through carrier proteins across the plasma membrane is called:
 A. Passive Diffusion
 B. Endocytosis
 C. Active Transport
 D. Facilitated diffusion
 (MDCAT 2016)
- Q.26 The basic structure of plasma membrane is provided by:
 A. Proteins
 B. Cytoskeleton
 C. Cholesterol
 D. Phospholipids
 (MDCAT 2017)
- Q.27 Taking in of solid particle by cell is called:
 A. Phagocytosis
 B. Exocytosis
 C. Pinocytosis
 D. Endocytosis
 (MDCAT 2017)
- Q.28 Self-eating ability of lysosomes is called:
 A. Phagocytosis
 B. Autophagy
 C. Pinocytosis
 D. Exocytosis
 (MDCAT 2017)
- Q.29 Passive processes for the movement of molecules across cell surface membrane are:
 A. Facilitated diffusion and osmosis
 B. Diffusion and exocytosis
 C. Pinocytosis and facilitated diffusion
 D. Osmosis and phagocytosis
 (AJK 2019)
- Q.30 The fluid mosaic model of cell membrane is:
 A. Protein layers having scattered phospholipids
 B. Phospholipid bilayer is enclosed in protein layer
 C. Carbohydrate chains are attached with phospholipid bilayer
 D. In which protein molecules are free to move about in a fluid bilayer of phospholipid molecules
- Q.31 Cell permeability and transport processes of cell membrane depend upon its _____ component.
 A. Phospholipid
 B. Carbohydrate
 C. Polysaccharide
 D. Cellulose
 (NTS 2019)
- Q.32 According to the fluid mosaic model of cell membrane, which zone is embedded inside?
 A. Hydrophobic
 B. Globular
 C. Hydrophilic
 D. Filamentous
 (PMC 2020)

PMC Topic-4

Cell Structure and Function

- Q.33 Which of the following is not the function of cell membrane?
 A. Protection of cytoplasm
 B. Regulating the passage of different molecules
 C. Protein synthesis
 D. Cellular communication
 E. Cellular transportation
- Q.34 When plant cell receives a signal for death, it commits suicide by rupturing:
 A. Nucleus
 B. Cell membrane
 C. Tonoplast
 D. Chloroplast
 (NTS 2019)
- Q.35 An enzyme that is attached to cell membrane of cell:
 A. Adenylate cyclase
 B. Cytochrome oxidase
 C. Succinate dehydrogenase
 D. Glucokinase
- Q.36 Which of the following is not associated with both prokaryotic and eukaryotic cell membrane?
 A. Receptors
 B. Enzymes
 C. DNA replication
 D. Antigens
- Cytoplasm and Cell Organelles**
- Q.37 Peripheral parts of the cell are often like:
 A. Sol
 B. Gel
 C. Solid
 D. None of these
- Q.38 It is false about cytoplasm of eukaryotic cell:
 A. Glycolysis
 B. Transcription
 C. Site of glycogen storage
 D. Translation
- Q.39 All of the following organelles contain DNA except:
 A. Ribosomes
 B. Nucleus
 C. Chloroplast
 D. Mitochondria
- Q.40 40S is the smaller ribosomal sub-unit, associated with _____.
 A. *E. coli*
 B. Yeast
 C. *C. botulinum*
 D. *T. pallidum*
- Q.41 Identify non-membranous organelle from the following:
 A. Endoplasmic reticulum
 B. Nucleus
 C. Ribosome
 D. Chloroplast
- Q.42 Ribosomes are tiny organelles, which are involved in the synthesis of:
 A. Protein
 B. Nucleus
 C. RNA
 D. Nucleosome
 (MDCAT 2015)
- Q.43 Which one of the following organelle is found in both prokaryotic and eukaryotic cells?
 A. Centriole
 B. Nucleus
 C. Endoplasmic Reticulum
 D. Ribosome
 (MDCAT 2016)
- Q.44 Ribosomes present in prokaryotes are: _____
 A. 80S
 B. 50S
 C. 60S
 D. 70S
 (MDCAT 2017, MDCAT 2019)
- Q.45 Group of ribosomes attached to mRNA is called: _____
 A. Polyploid
 B. Polynucleotide
 C. Polysome
 D. Polysaccharide
 (MDCAT 2017)

- Q.46 Which of the following organelle consist of two subunits?
 A. Golgi body
 B. Ribosome
 C. Mitochondria
 D. Plastid (MDCAT 2017)
- Q.47 Site of protein synthesis in cell is:
 A. Ribosome
 B. Nucleolus
 C. Endoplasmic reticulum
 D. Smooth endoplasmic reticulum (MDCAT 2018, MDCAT 2019)
- Q.48 Ribosomes are made up of _____ and _____.
 A. RNA and proteins
 B. RNA and carbohydrates
 C. RNA and lipids
 D. Proteins and carbohydrate (MDCAT 2018)
- Q.49 The cytoplasmic organelle commonly found both in prokaryotes and eukaryotes is:
 A. Flagellum
 B. Ribosome
 C. Mitochondria
 D. Nucleoid (PMC 2020)
- Q.50 70S sized ribosomes are found in the cells of:
 A. Algae
 B. Protozoans
 C. Fungi
 D. Bacteria (MDCAT 2017)
- Q.51 Select the organelle which is only present in animal cells.
 A. Centrioles
 B. Microtubules
 C. R.E.R
 D. Ribosomes (MDCAT 2017)
- Q.52 Which of the following structure is present in both plant and animal cells but is absent in prokaryotic cells?
 A. Centrioles
 B. Plastids
 C. Microtubule
 D. Sieve tubes
- Q.53 Glycolysis is the common stage in both aerobic and anaerobic respiration and it occurs in _____ of the cell.
 A. Inner membrane of mitochondria
 B. Mitochondrial matrix
 C. Chloroplast
 D. Cytoplasm (AJK 2019)
- Q.54 Which of the following is true about cytoplasm?
 A. It can exist only in gel form
 B. It is the region between nucleus and cell membrane
 C. 70% of the cytoplasm is water
 D. Both prokaryotes and eukaryotes show cyclosis

Endoplasmic Reticulum

- Q.55 Which of the following best describes the function of RER in eukaryotic cells?
 A. Glycosylation of proteins
 B. Synthesis of proteins
 C. Synthesis of lipids
 D. Synthesis of ribosomes
- Q.56 Which of the following statement is incorrect regarding endoplasmic reticulum?
 A. Plasma cells have RER in abundance
 B. RER is more abundant than SER in adipose tissue
 C. RBCs lack both RER and SER
 D. Hepatocytes have both RER and SER
- Q.57 A function that is not related to smooth endoplasmic reticulum:
 A. Calcium storage
 B. Enzyme synthesis
 C. Steroid synthesis
 D. Mechanical support
- Q.58 Which of the following organelle is associated with the single membrane?
 A. Mitochondria
 B. Nucleus
 C. Endoplasmic Reticulum
 D. Chloroplast

- Q.59 Which of the following function is performed by both types of endoplasmic reticulum?
 A. Protein synthesis
 B. Muscle contraction
 C. Mechanical support
 D. Detoxification of harmful drugs
- Q.60 Which of the following organelle is responsible for the production of steroid hormones?
 A. Mitochondria
 B. Smooth endoplasmic reticulum
 C. Golgi bodies
 D. Rough endoplasmic reticulum
- Q.61 Which one of the following cell structure is involved in the synthesis of lipids?
 A. Endoplasmic reticulum
 B. Centriole
 C. Golgi complex
 D. Mitochondria (MDCAT 2015)
- Q.62 The organelle involved in detoxification of drugs and poisons in the liver cells:
 A. Smooth Endoplasmic Reticulum
 B. Golgi apparatus
 C. Rough Endoplasmic Reticulum
 D. Lysosomes (MDCAT 2016)
- Q.63 Nuclear membrane is continuous with:
 A. E.R
 B. Lysosome
 C. Golgi Body
 D. Peroxisome (MDCAT 2017)
- Q.64 Which of the following is correctly matched?
 (NTS 2017)
- | | |
|----------------|---|
| A. Ribosomes | Detoxification of alcohol |
| B. Lysosomes | Formation of astral ray |
| C. Centrioles | Protein synthesis |
| D. Peroxisomes | Destroyers of foreign particles |
| E. SER | Converts cholesterol into vitamin D in skin |
- Q.65 Lipid synthesis or lipid metabolism is the function of:
 A. Smooth endoplasmic reticulum
 B. Mitochondria
 C. Rough endoplasmic reticulum
 D. Golgi complex (MDCAT 2018)
- Q.66 Smooth endoplasmic reticulum is responsible for the metabolism of:
 A. Carbohydrates
 B. Nucleic acids
 C. Proteins
 D. Lipids (MDCAT 2019)
- Q.67 Select the one which is not a function of smooth endoplasmic reticulum (SER).
 (PMC 2020)
- A. Metabolism of lipids
 B. Transport of materials
 C. Transmission of impulses
 D. Processing of glycoproteins
- Q.68 Which of the following is not a product of ER in animal cells?
 A. Lysozymes
 B. ATP synthase
 C. Progesterone
 D. Na⁺ channels

Golgi Apparatus/Golgi Complex/Golgi Bodies

- Q.69 Identify the correct pair from the following options:
 A. DNA replication - Ribosome
 B. Anaerobic respiration - Cristae
 C. Protein synthesis - SER
 D. Modification - Golgi apparatus
- Q.70 Modification of proteins and lipids into glycoproteins and glycolipids is the function of:
 A. Mitochondria
 B. Lysosome
 C. Ribosomes
 D. Golgi apparatus
- Q.71 Golgi complex is involved in the formation of _____.
 A. Lysosomes
 B. Vacuoles
 C. RER
 D. SER

- Q.72 The transport of secretory proteins takes place through organelles in which of the following order?
 A. RER → SER → Golgi apparatus → Secretory vesicles
 B. SER → RER → Golgi apparatus → Secretory vesicles
 C. RER → SER → Secretory vesicles → Golgi apparatus
 D. RER → Golgi apparatus → Secretory vesicles → SER
- Q.73 The cisternae break up into vesicles from _____ and _____ of Golgi complex. (MDCAT 2018)
 A. Convex, forming face
 B. Convex, maturing face
 C. Concave, forming face
 D. Concave, maturing face (MDCAT 2014, 2019)
- Q.74 Which cell organelle is responsible for cell secretion?
 A. Mitochondrion
 B. Ribosomes
 C. Chloroplast
 D. Golgi body
- Q.75 Which of the following organelles are involved in the synthesis of plant cell wall? (PMC 2020)
 A. Endoplasmic reticulum
 B. Lysosomes
 C. Golgi complex
 D. Peroxisomes
- Q.76 Which of the following does not originate from Golgi complex?
 A. Lysosome
 B. Glyoxysome
 C. Peroxisome
 D. All originate from Golgi complex
- Q.77 Phragmoplast is associated with:
 A. ER
 B. Golgi complex
 C. Mitochondria
 D. Chloroplast
- Lysosomes**
- Q.78 Which of the following organelle is most abundant in those animal cells which exhibit phagocytic activity?
 A. Glyoxysomes
 B. Lysosomes
 C. Microbodies
 D. Peroxisome
- Q.79 It is a disease characterized by the accumulation of lipids in the brain cells leading to mental retardation and even death:
 A. Grave's disease
 B. Glycogenesis type II disease
 C. Addison's disease
 D. Tay-Sach's disease
- Q.80 Tay-Sach's disease occurs when cells are unable to produce an enzyme leading to a build up to certain lipids in cell. Which cells structure would not function correctly, resulting in the disease? (LUMHS 2015)
 A. Golgi apparatus
 B. Lysosomes
 C. Mitochondria
 D. SER
- Q.81 These structures are involved in the breakdown of old organelles: (MDCAT 2018)
 A. Leucoplasts
 B. Glyoxysomes
 C. Lysosomes
 D. Peroxisomes
- Q.82 Strictly speaking, autophagosomes are actually:
 A. Primary lysosomes
 B. Tertiary lysosomes
 C. Secondary lysosomes
 D. Quaternary lysosomes
- Q.83 Suicidal bags are:
 A. Peroxisomes
 B. Lysosomes
 C. Mitochondria
 D. Chloroplast

Plastids/Chloroplasts

- Q.84 Which of the following eukaryotic organelle has symbiotic origin with bacteria?
 A. Endoplasmic reticulum
 B. Lysosomes
 C. Chloroplast
 D. Golgi apparatus
- Q.85 Chlorophyll molecule resembles with:
 A. Carotenoids
 B. Globin chains of hemoglobin
 C. Xanthophylls
 D. Haem part of hemoglobin
- Q.86 Which of the following statement is incorrect?
 A. CO₂ fixation occurs in stroma
 B. Chloroplasts are self-replicating
 C. Inter-granum is photosynthetic
 D. Chloroplasts have 70S ribosomes
- Q.87 Which statement is correct about mitochondria and chloroplast?
 A. Chloroplast and mitochondria cannot live independently (MDCAT 2018)
 B. 70S ribosome is attached with the inner membrane of mitochondria and chloroplast
 C. Chloroplast and mitochondria are single membrane structure
 D. Number of mitochondria and chloroplast are same in all cells
- Q.88 Among followings which cellular organelle contains circular DNA similar to those found in bacteria? (MDCAT 2019)
 A. Ribosome
 B. Chloroplast
 C. Lysosome
 D. Nucleus
- Q.89 Each chloroplast contains _____ grana.
 A. 10-30
 B. 40-60
 C. 100-130
 D. 150-180
- Vacuoles**
- Q.90 _____ provides support for the individual plant cell and contributes to the turgidity of the leaves and younger parts of plants.
 A. Vacuole
 B. Endoplasmic reticulum
 C. Golgi apparatus
 D. Cytoskeleton
- Q.91 What is the specific name given to biological membrane that surrounds the vacuoles?
 A. Plasma membrane
 B. Plasmalemma
 C. Endomembrane
 D. Tonoplast
- Q.92 Presence of large central vacuole is the characteristic of: (MDCAT 2016)
 A. Prokaryotes
 B. Fungi
 C. Protists
 D. Plants
- Q.93 Which of these is solely present in plant cell only? (AJK 2019)
 A. Peroxisomes
 B. Smooth endoplasmic reticulum
 C. Cytoskeleton
 D. Central vacuole
- Q.94 The membrane separating the vacuole from cytoplasm is called:
 A. Cristae
 B. Tonoplast (MDCAT 2018, PMC 2020)
 C. Cisternae
 D. Vacuolar membrane
- Mitochondria**
- Q.95 Which of the following cell organelle can be viewed with the help of high power light microscope?
 A. Endoplasmic reticulum
 B. Mitochondria
 C. Ribosomes
 D. Golgi apparatus
- Q.96 It is the correct location of ATP synthase in mitochondria:
 A. Mitochondrial matrix
 B. Outer mitochondrial membrane
 C. Inner mitochondrial membrane
 D. Inter membrane space

- Q.97 Which of the following structure is involved in oxidative phosphorylation?
 A. Inner mitochondrial membrane
 B. Outer mitochondrial membrane
 C. Mitochondrial matrix
 D. Thylakoid membrane
- Q.98 Krebs cycle occurs in the _____ of mitochondria.
 A. Matrix
 B. Stroma
 C. F₁ particles
 D. Cristae
- Q.99 Which of the following cell type is more appropriate to study mitochondria?
 A. RBC
 B. Mesophyll cell
 C. Muscle cell
 D. *E. coli*
- Q.100 In mitochondria, small knob-like structures called F₁ particles are found in: (MDCAT 2014)
 A. Outer membrane
 B. Inner membrane
 C. Outer compartment
 D. Inner compartment
- Q.101 Which organelle is bounded by two membranes?
 A. Ribosome
 B. Lysosome
 C. Mitochondria
 D. Nucleolus
- Q.102 The inner membrane of mitochondria forms extensive infoldings called: (MDCAT 2016)
 A. Cristae
 B. Lamella
 C. Cisternae
 D. Bifidae
- Q.103 Functionally, mesosomes can be compared with: (MDCAT 2017)
 A. Ribosomes
 B. Polysomes
 C. Mitochondria
 D. Golgi bodies
- Q.104 Organelle involved in aerobic respiration:
 A. Mitochondria
 B. Plastids
 C. Lysosome
 D. Ribosome
- Q.105 Inner membrane of mitochondria is called:
 A. Cisternae
 B. Lemma
 C. Cristae
 D. Tonoplast
- Q.106 Which organelle is required for aerobic respiration? (NTS 2018)
 A. Plastids
 B. Mitochondria
 C. ER
 D. Nucleus
- Q.107 The finger like infoldings which are formed by inner membrane of mitochondria are called: (MDCAT 2019)
 A. Matrix
 B. Cristae
 C. Porins
 D. Ribosomes
- Q.108 The structure in double-membrane bound organelle, primarily involved in ATP generation through cellular respiration is: (AJK 2019)
 A. F₁-particles
 B. Mitoplast
 C. Mitochondria
 D. Ergastoplasm
- Q.109 F₀-F₁ particles is another name for:
 A. ATP synthetase
 B. ATP synthase
 C. Cytochrome complex
 D. None of these

Nucleus

- Q.110 Nucleolus is visible in:
 A. Interphase
 C. Mitotic phase
 B. Metaphase
 D. Anaphase
- Q.111 Which of the following organelle have a continuous connection with nuclear membrane?
 A. Golgi Apparatus
 C. Lysosomes
 B. RER
 D. SER
- Q.112 It precisely describes the function of nucleoli:
 A. Formation and breakdown of nuclear envelope
 C. Formation of centromere
 B. Formation of ribosomes
 D. Organization of spindle during nuclear division
- Q.113 rRNA is actively synthesized in:
 A. Lysosome
 C. Nucleolus
 B. Nucleoplasm
 D. Ribosomes
- Q.114 How many nuclear pores are present a typical differentiated cell, such as RBCs?
 A. About 30,00 per nucleus
 C. About 30,000 per nucleus
 B. About 1-2 per nucleus
 D. About 3-4 per nucleus
- Q.115 Ribosomal RNA is synthesized in: (MDCAT 2017)
 A. Nucleolus
 C. Peroxisome
 B. Golgi body
 D. Nucleoplasm
- Q.116 The structure present in a eukaryotic cell but absent in prokaryotic cells is: (MDCAT 2019)
 A. Nucleus
 C. DNA
 B. Ribosomes
 D. Cell surface membrane
- Q.117 It makes nucleoli during interphase:
 A. Primary constriction
 C. Centromere
 B. Secondary constriction
 D. Telomeres
- Compare the Structure of Typical Prokaryotic and Eukaryotic Cells**
- Q.118 Which of the following statement is true?
 A. Prokaryotic cells are bigger than eukaryotic cells
 B. Prokaryotic cells evolved before eukaryotic cells
 C. Eukaryotic cells do not have a nucleus, prokaryotic cell do
 D. Eukaryotic cells are simple, prokaryotic cells are complex
- Q.119 What is the main difference between prokaryotes and eukaryotes?
 A. Prokaryotes cannot undergo cell division
 C. Prokaryotes have no DNA
 B. Prokaryotes do not have internal membranes
 D. Prokaryotes have no cytosol
- Q.120 Prokaryotic and eukaryotic cells generally have which of the following feature in common?
 A. A membrane bounded nucleus
 C. Presence of ribosomes
 B. A cell wall made up cellulose
 D. Linear genome
- Q.121 The distinguishing feature of prokaryotic cell is its:
 A. Chemical nature of DNA
 C. Cell wall
 B. Ribosomes
 D. Cytoplasmic Streaming movement
- Q.122 Peptidoglycan or murein is a special or distinctive feature of cell wall in: (MDCAT 2014)
 A. Algae
 C. Fungi
 B. Bacteria
 D. Plants
- Q.123 DNA molecule in prokaryotes is: (MDCAT 2017)
 A. Single, circular, double stranded molecule not bound by membrane
 B. Double, circular molecule
 C. Linear, double stranded molecule
 D. Single, circular, double stranded and membrane bound

ANSWER KEY

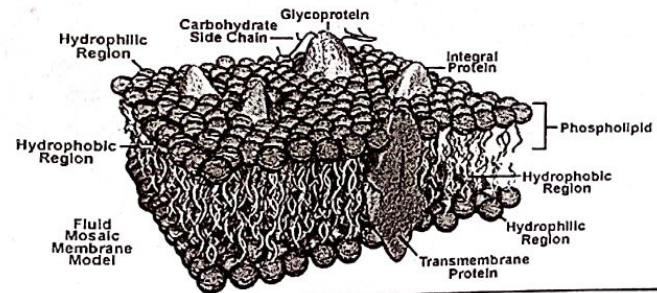
TOPIC-WISE MCQs & PAST PAPER MCQs

1	D	16	B	31	A	46	B	61	A	76	D	91	D	106	B	121	C
2	A	17	B	32	A	47	A	62	A	77	B	92	D	107	B	122	B
3	A	18	C	33	C	48	A	63	A	78	B	93	D	108	A	123	A
4	B	19	D	34	B	49	B	64	E	79	D	94	B	109	B		
5	D	20	D	35	A	50	D	65	A	80	B	95	E	110	A		
6	B	21	B	36	C	51	A	66	D	81	C	96	C	111	B		
7	C	22	B	37	B	52	C	67	D	82	C	97	A	112	B		
8	C	23	B	38	B	53	D	68	B	83	B	98	A	113	C		
9	D	24	C	39	A	54	B	69	D	84	C	99	C	114	D		
10	B	25	D	40	B	55	B	70	D	85	D	100	B	115	A		
11	D	26	D	41	C	56	B	71	A	86	C	101	C	116	A		
12	C	27	A	42	A	57	B	72	A	87	B	102	A	117	B		
13	C	28	B	43	D	58	C	73	D	88	B	103	C	118	B		
14	C	29	A	44	D	59	C	74	D	89	E	104	A	119	B		
15	B	30	D	45	C	60	B	75	C	90	A	105	C	120	C		

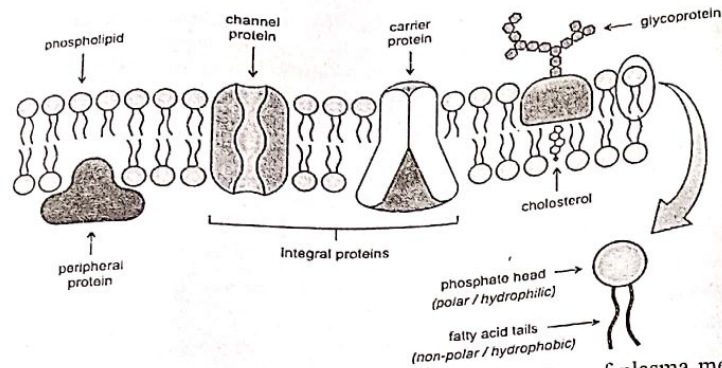
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

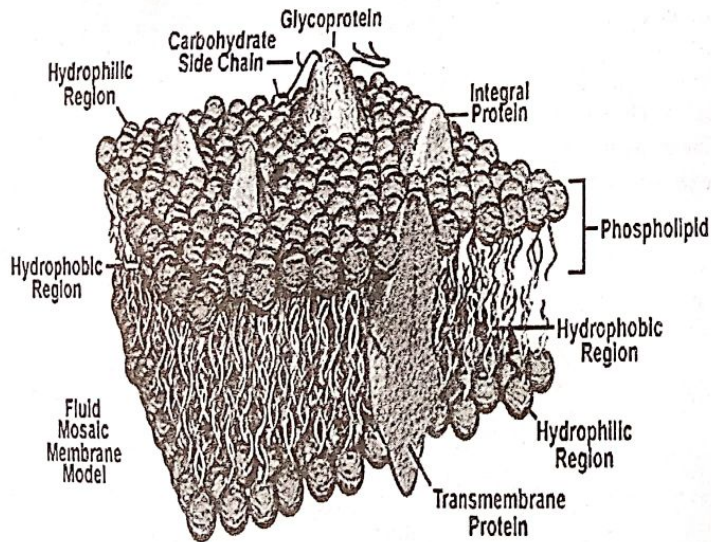
- Cell theory is a fundamental concept in biology. It explains basis of living unit of life that is cell. Virus is not considered a living organism.
- Magnification of microscope is calculated by multiplying power of an objective lens and eyepiece.
- Human eye can differentiate between two points that are 1 mm away. When distance is less than 1 mm, naked human eye cannot differentiate it and microscope is needed for that.
- Cell fractionation is a process by which components of a cell are separated. This process has many steps and they are sequenced as mentioned in highlighted answer.
- Plants contain cell wall as outer most membrane whereas in animal cell it is absent.
- Centrioles are absent in higher plant cells.
- Chloroplast, cell wall and large central vacuole are the organelles which are absent in an animal cells but present in plant cells.
- Chloroplast is not present in animal cells, while nucleus, cytoplasm and mitochondria are present in both plants and animal cells.
- Cellulose fibers are responsible for strengthening of cell wall of plants in crisscross manner and placing these fibers at right angle with each other gives more strength.
- Cell wall of prokaryotes is composed of polysaccharide chains bounded to shorter chains of amino acid forming peptidoglycan or murein. The entire cell wall is often regarded as a single huge molecule called sacculus.
- All are present in secondary cell wall except pectin, as it is component of primary cell wall.
- In animal cells, the outer most boundary is cell membrane, where as in plants it is cell wall.
- Cellulose is present in both primary cell wall and secondary cell wall. Middle lamella is composed of sticky, gel-like magnesium and calcium salts (pectates) and pectin.
- Middle lamella is composed of sticky, gel-like magnesium and calcium salts (pectates) and pectin. The middle lamella holds neighboring cell walls together.
- Globular proteins, polysaccharides and phospholipids are present in both prokaryotic and eukaryotic cell membranes while cholesterol is present only in eukaryotic cell membrane.
-



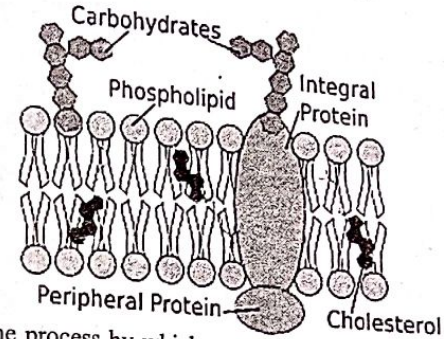
17.



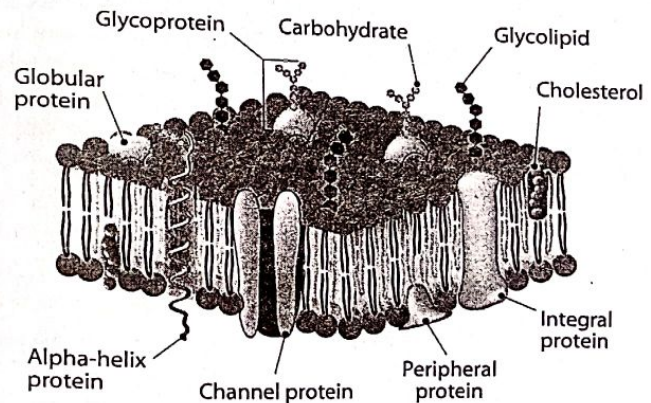
18. Glycolipids and glycoproteins are oriented towards outer surface of plasma membrane, form glycocalyx, and act as receptors.
19. The animal cell membrane provides mechanical support, maintain cellular homeostasis, and regulate passage of molecules across the membrane. It does not prevent the animal cell from osmotic lysis, it is the function of cell wall, which is absent in animal cells.
20. Glycoproteins, which are present on plasma membrane, can act as receptors for hormones and various other molecules.
21. Cell membrane is the most important structure because it is responsible for identity and integrity of the cell.
22. The ingestion of liquid material into a cell by the budding of small vesicles from the cell membrane is called pinocytosis while the process by which certain living cells called phagocytes ingest or engulf other cells or solid particles is called phagocytosis.
- 23.



24. Fluid mosaic model of the plasma membrane describes the arrangement of phospholipids in two layers, stabilized interiorly by the hydrophobic interactions while hydrophilic interactions at intracellular and extracellular faces with embedded proteins randomly.
25. Facilitated diffusion also known as facilitated transport or passive-mediated transport. It is the process of spontaneous passive transport of molecules or ions across a biological membrane via specific trans-membrane integral proteins.
- 26.



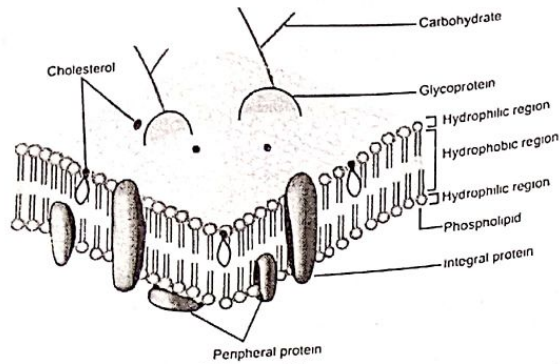
27. Phagocytosis is the process by which a cell uses its plasma membrane to engulf a large solid particle, giving rise to an internal compartment called the phagosome. It is one type of endocytosis while pinocytosis, otherwise known as fluid endocytosis is a mode of endocytosis in which small particles suspended in extracellular fluid are brought into the cell through an invagination of the cell membrane, resulting in a suspension of the particles within a small vesicle inside the cell.
28. Autophagy is the natural, regulatory mechanism of the cell that removes unnecessary or dysfunctional components. It allows the orderly degradation and recycling of cellular components with the help of lysosomes.
29. Osmosis, diffusion and facilitated diffusion are passive processes of passage of molecules across the cell membrane but exocytosis and endocytosis are active processes of molecules across the cell.
- 30.



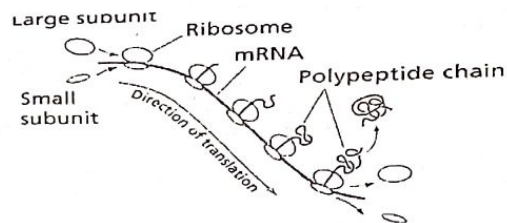
PMC Topic-4

Cell Structure and Function

31. Permeability of membrane depends upon phospholipids in plasma membrane.
 32.



33. Protein synthesis is the function of ribosomes.
 34. Any type of damage in cell membrane can cause death of cell of an organism.
 35. This enzyme is attached with cell membrane of cell and it converts ATP into cyclic AMP.
 36. Receptors, enzymes and antigens all are found in both prokaryotic and eukaryotic cell membrane. However, only prokaryotic cell membrane is associated with DNA replication.
 37. Consistency of cytoplasm is both like sol and gel, but peripheral part is more gel like while central is sol like.
 38. Cytoplasm is a site for many important biochemical reactions such as glycolysis, protein synthesis etc. in both prokaryotic and eukaryotic cells. Transcription in eukaryotic cell takes place in nucleus.
 39. Nucleus contains linear DNA, chloroplast and mitochondria also have their own circular DNA while ribosomes are made up of rRNA and protein.
 40. *E. coli*, *C. botulinum* and *T. pallidum* are prokaryotic organisms having 30S smaller ribosomal subunit, while yeast is eukaryotic organism having 40S smaller ribosomal subunit and 60S larger sub-unit.
 41. Endoplasmic reticulum is single membrane bounded organelle. Nucleus and chloroplast both are double membrane bounded organelles, while ribosomes are a non-membranous organelle.
 42. Ribosomes are factory of protein synthesis; nucleolus is a factory of ribosomes synthesis.
 43. Membrane bounded organelles are absent in prokaryotic cells but present in eukaryotic cells. Ribosomes are non-membranous and are present in both prokaryotic and eukaryotic cells.
 44. The size of the ribosomes present in prokaryotic and eukaryotic cells is 70S and 80S, respectively. 70S ribosomes are, however, present in some eukaryotic organelles like mitochondria and chloroplasts.

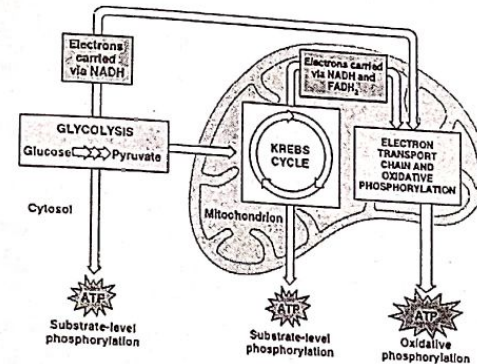


PMC Topic-4

Cell Structure and Function

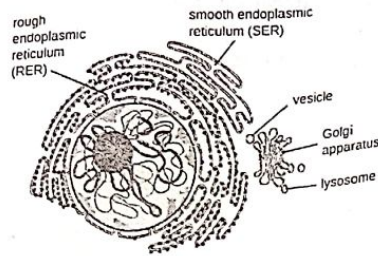
46. A ribosome is made up of two sub-units, larger and smaller subunits. In case of eukaryotic cell, larger subunit is 60S and smaller subunit is 40S while prokaryotic cell has 50S and 30S larger and smaller sub-units, respectively.
 47. Ribosome is the factory of protein synthesis. But the factory of ribosomes synthesis is nucleolus.
 48. Chemically ribosomes are composed of an almost equal amount of RNA and proteins; hence, they are ribonucleo-protein particles.
 49. Presence of ribosomes is one of the common features between prokaryotic and eukaryotic cells.
 50. There are two types of ribosomes in living world. Smaller is 70S that is present in prokaryotes.
 51. Centrioles are present only in animal cell but RER, microtubules and ribosomes are present in both animal and plant cells.
 52. Microtubules are responsible for spindle formation and these ensure mitosis and meiosis in eukaryotic cells. Mitotic and meiotic cell divisions are absent in bacterial cells instead bacterial cells divide through binary fission.

53.



54. Cytoplasm is the region between nucleus and cell membrane. It has both cytosol and cytogel. About 90% of cytoplasm is water. Cyclosis is a feature of eukaryotic cells.
 55. Due to presence of ribosomes on RER it involves in protein synthesis, while lipids are synthesized by SER. Ribosomes synthesized by nucleolus.
 56. Adipose tissue is concerned with conversion, synthesis and storage of lipids that is why it contains more SER than RER.
 57. Calcium storage and steroid synthesis is the function of SER, while enzyme synthesis is the function of RER. Mechanical support is, however, related to both SER and RER.
 58. Nucleus, chloroplast and mitochondria are double membranous organelles while endoplasmic reticulum is single membrane organelle.
 59. Detoxification of drugs is the function of SER while protein synthesis is the function of RER. Mechanical support, however, is the function of both RER and SER.
 60. Mitochondria are responsible for fatty acid metabolism while steroid biosynthesis takes place in SER.
 61. Mitochondria are responsible for fatty acid catabolism while lipid synthesis takes place in SER.

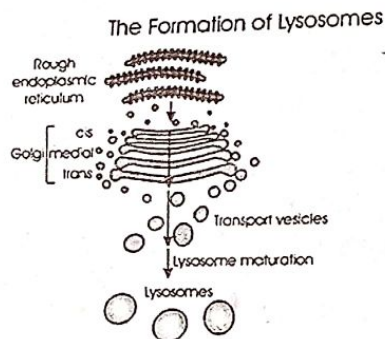
62. The detoxification of drugs is the function of SER while protein synthesis is the function of RER. Mechanical support, however, is the function of both RER and SER.
- 63.



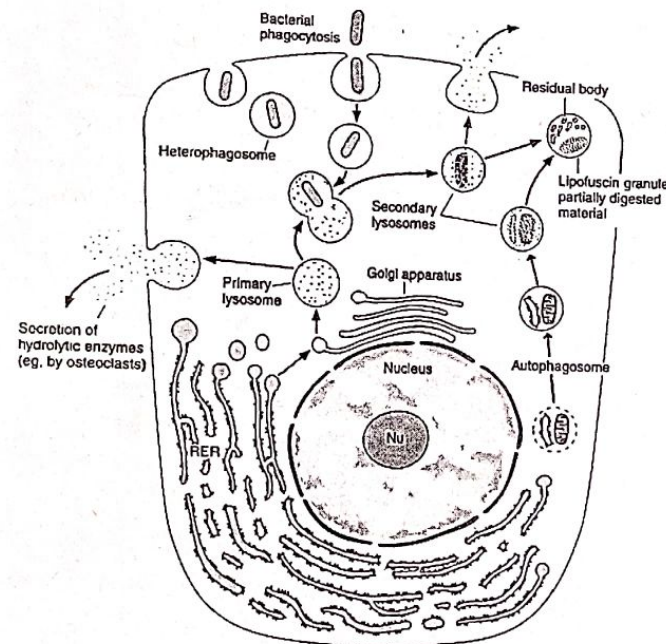
64.

A	Ribosomes	Protein synthesis
B	Lysosomes	Destroyers of foreign particles
C	Centrioles	Formation of astral ray
D	Peroxisomes	Hydrogen peroxide formation and decomposition
E	SER	Converts cholesterol into vitamin D in skin

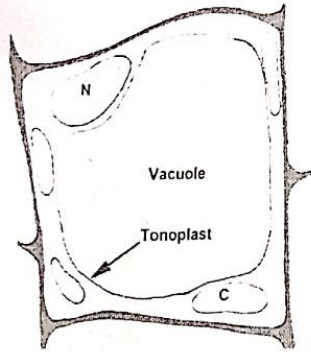
65. SER is responsible for lipid metabolism, detoxification, nerve impulse conduction and transport of material in the cell.
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67. Secretory proteins are synthesized on RER, then transferred to Golgi apparatus through SER for final processing and packaging and finally released as secretory vesicles.
68. ATP synthases are present in cristae (mitochondria). They are encoded by mitochondrial DNA.
69. DNA replication occurs in nucleus, proteins are synthesized by RER and anaerobic respiration occurs in cytoplasm. Chemical modification of biological molecules is the function of Golgi apparatus.
70. The enzymes required for proteins glycosylation are solely found in lumen of endoplasmic reticulum and Golgi complex. Hence, the more appropriate answer is "D". Golgi bodies are center for modifications and packaging.
- 71.



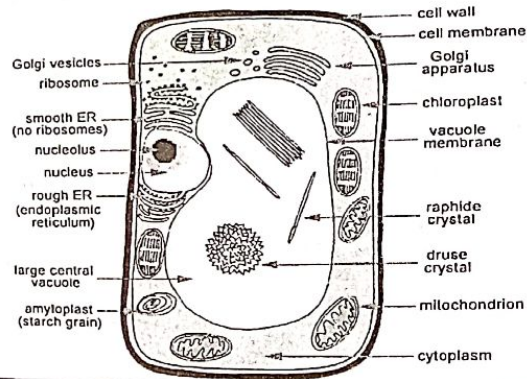
72. Proteins are synthesized on RER, and then they are transported toward Golgi apparatus with the help of SER, where these proteins are modified. Modified proteins are transported out of the cell in the form of secretory vesicles.
73. Maturing, concave and inner face of the Golgi complex is the site from where Golgi vesicles after processing are budded off.
74. Golgi complex is considered as secretory organelle of the cell. Secretory proteins are synthesized on RER, then transferred to Golgi apparatus through SER for final processing and packaging and finally released as secretory vesicles.
75. The vesicles formed from Golgi complex secrete plant cell wall.
76. Certain organelles, such as lysosomes, peroxisomes and Glyoxysomes also originate from Golgi complex.
77. At cytokinesis, in plants, Golgi vesicles are arranged on the cell equator, fuse together and form a structure called phragmoplast.
78. Lysosomes are most abundant in those cells which are specialized for phagocytic activities, for example neutrophils.
79. Storage diseases are due to the absence of lysosomal enzymes. If a lysosomal enzyme responsible for lipid metabolism is absent, it leads to the accumulation of lipids in brain cells which causes mental retardation and death, such storage disease is known as Tay-Sach's disease.
80. Tay-Sach's disease is a genetic disorder that results in the destruction of nerve cells in the brain and spinal cord. It is due to deficiency of lipids digesting enzyme in body.
81. Lysosomes are membrane bound, dense granular structures containing hydrolytic enzymes responsible mainly for intracellular and extracellular digestion.
- 82.



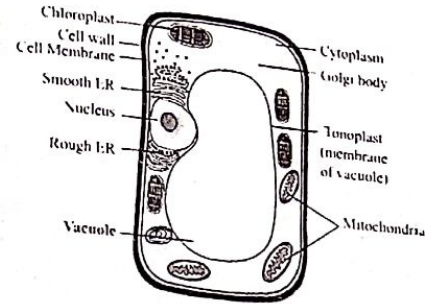
83. In programmed cell death lysosomes, burst and their enzyme contents are quickly dispersed throughout the cytoplasm. In this way, the cell is disintegrated into fragments, which are phagocytosed by other cells. Due to this function, lysosomes are also called suicidal bags.
84. Two most important organelles e.g. chloroplast and mitochondria, are thought to be originated from prokaryotes and are explain with the help of endosymbiont hypothesis.
85. The only difference between chlorophyll and haemoglobin is that chlorophyll has Mg^{++} while haem has Fe^{++} as the central atom.
86. Inter-granum is non-green part that connects two grana. The process of photosynthesis does not occur in inter-granum because of absence of chlorophyll.
87. Mitochondria and chloroplasts both are considered as semiautonomous organelles, as they have their own circular DNA and 70S ribosomes. Mitochondria are present in both plant and animal cells but chloroplast is present in autotrophic eukaryotes.
88. Mitochondria and chloroplasts both are considered as semiautonomous organelles, as they have their own circular DNA and 70S ribosomes. Mitochondria are present in both plant and animal cells but chloroplast is present in autotrophic eukaryotes.
89. There are about 40 – 60 grana found in each chloroplast.
90. Vacuoles provide support for the individual plant cell and contribute to the turgidity of the leaves and younger parts of the plants.
- 91.



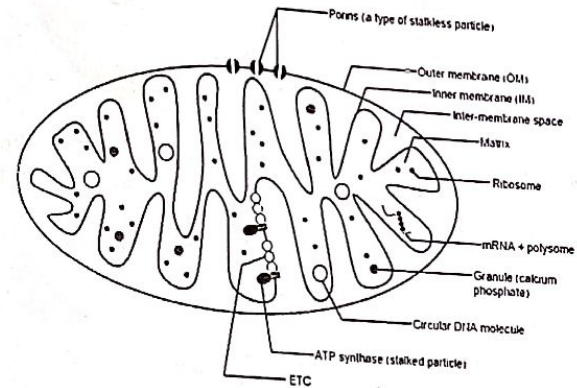
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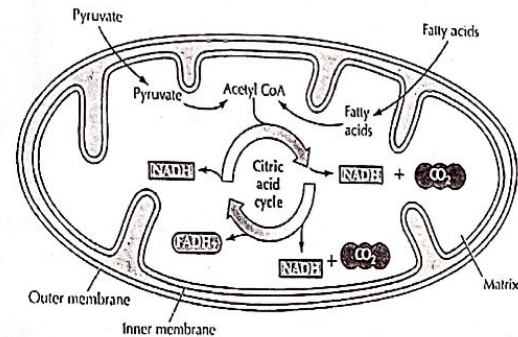
93. Plants have large central vacuole and it is vital for their functioning.
- 94.



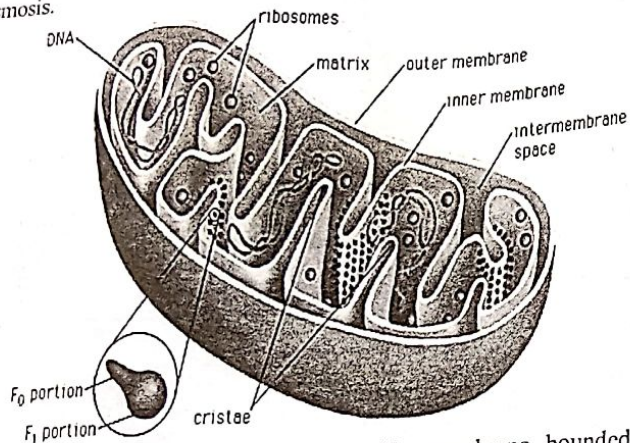
95. Due to large size of mitochondria as compared to endoplasmic reticulum, Golgi apparatus and ribosomes, it can be visualized easily with the help of light microscope.
- 96.



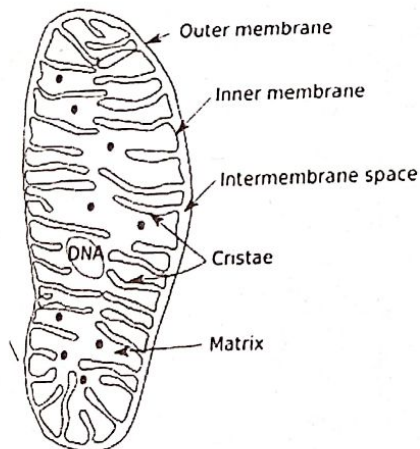
97. E.T.C occurs in inner mitochondrial membrane which provides the site for pumping of protons across it. Oxidative phosphorylation is associated with ETC.
- 98.



99. Mitochondria are most abundant in muscle cells because of the strenuous metabolic activities. *E. coli* is a prokaryotic organism and lack mitochondria. RBCs also lack mitochondria.
100. F_1 particles are located on cristae, the infoldings of inner mitochondrial membrane. F_1 particle is actually ATP synthase, which plays role in synthesis of ATP through chemiosmosis.

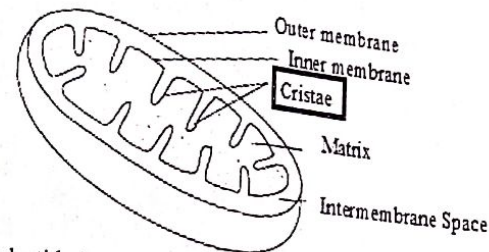


101. Mitochondria, chloroplast and nucleus are double membrane bounded organelles. Lysosomes, Golgi complex, endoplasmic reticulum and micro-bodies are single membranous organelles while ribosomes lack membrane.
- 102.

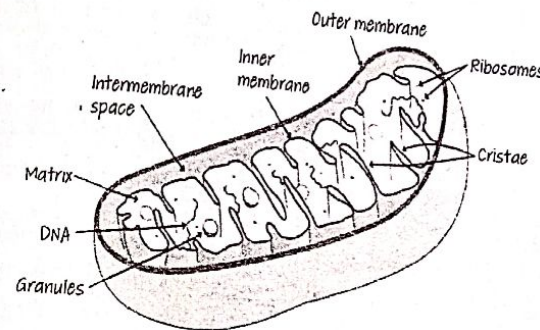


103. Mesosomes are membrane infoldings in bacterial cell and are more prominent in Gram negative bacteria. Mesosomes are the sites of cellular respiration. Electron transport chain occurs in mesosomes as mitochondria is absent in bacteria.
104. Mitochondria are power house of a cell. Aerobic cellular respiration takes place in mitochondria.

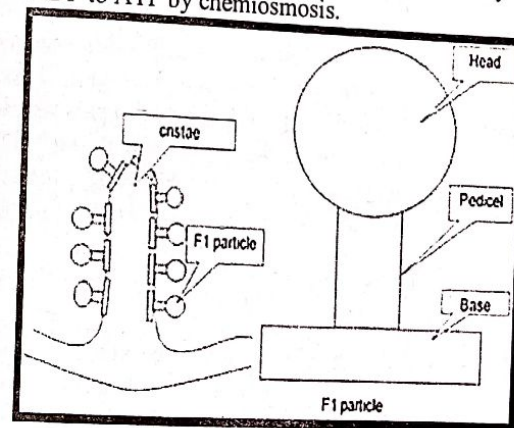
105.



106. Different types of plastids involve in sugar synthesis, storage and pollination in plants. ER involve in proteins and lipids synthesis, while nucleus is the brain of cell which control all of its activities.
- 107.

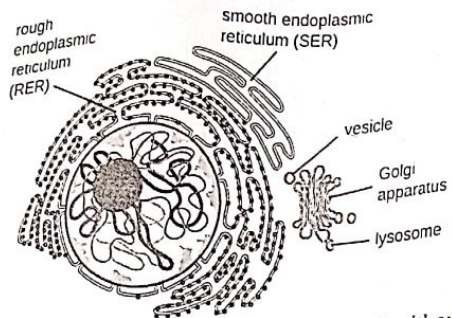


108. ATP synthase is also called as oxysome or F_1 -particles. They are responsible for phosphorylation of ADP to ATP by chemiosmosis.



109. The inner surface of cristae has granular structures called F_0 - F_1 particles. These particles are actually ATP synthase enzymes.
110. Nucleus and nucleolus are visible during interphase only because in mitotic phase, nuclear envelope disintegrates and mixing of nuclear contents with cytoplasm does occur.

111.



112. Nucleolus is the darkly stained area within the nucleus and without any membranous boundary to separate it from the rest of the nuclear material. These are said to be the factory of ribosomes while ribosomes are said to be the factory of protein synthesis.
113. The rRNA is synthesized and stored in nucleolus. Central fibril area of nucleolus has large molecular weight RNA and rDNA.
114. Number of nuclear pores is more in undifferentiated cells as compared to differentiated cells. Since RBCs are fully differentiated cells so they have 3-4 nuclear pores, but the number of nuclear pores in egg cells is about 30,000.
115. Ribosomal RNA is synthesized and stored in nucleolus. Central fibril area of nucleolus has large molecular weight RNA and rDNA.
116. The term 'prokaryotes' is derived from the Greek word 'pro-meaning before' and 'karyon meaning nucleus'. Prokaryotic cells are cells that do not have a true nucleus and membrane-bound organelles. Ribosomes are non-membranous organelle which present in both prokaryotes and eukaryotes.
117. Secondary constriction is also called as nucleolar organizer. It gives rise to nucleoli during interphase.
118. Prokaryotic cells may have arisen more than 3.5 billion years ago while eukaryotes are thought to have first appeared about 1.5 billion years ago.
119. Besides nuclear envelope, the main difference between prokaryotic and eukaryotic cell is the absence of membrane bounded organelles.
120. Both prokaryotic and eukaryotic cells have ribosomes while membrane bound nucleus, cellulosic cell wall and linear chromosomes are found only in eukaryotic cells.
121. The most distinguished feature of a prokaryotic cell is its cell wall. Chemically, it is composed of carbohydrates and short peptides. This complex molecule is called peptidoglycan/murein.
122. Bacteria cell wall is made up of peptidoglycan which has glycan with short chain of amino acids. Fungi cell wall is made up of chitin, while plants have cellulose in their cell wall.
123. Genomic DNA molecules in prokaryotes is single, circular, double stranded and not bounded by any membrane and it is freely dispersed in cytoplasm.

TOPIC-WISE MCQs

Nervous System

- Q.1 Information received by different receptors of body is analyzed by:
 A. Autonomic nervous system
 B. Central nervous system
 C. Parasympathetic nervous system
 D. Sympathetic nervous system
- Q.2 Ectoderm mainly gives rise to:
 A. Musculo-skeletal system
 B. Nervous system
 C. Respiratory system
 D. Cardiovascular system

Steps Involved in Nervous Coordination

- Q.3 A motor nerve carries impulses from:
 A. Spinal nerves to effectors
 B. Effectors to cranial nerves
 C. Effectors to CNS
 D. CNS to effectors
- Q.4 Which of the following produce response?
 A. Effectors
 B. Nerve
 C. Stimulators
 D. Brain (MDCAT 2017)

Sensory Receptors and Their Working

- Q.5 Pressure is felt by your body immediately after it is applied. This is achieved with the help of:
 A. Mechanoreceptors
 B. Thermoreceptors
 C. Nociceptors
 D. Chemoreceptor
- Q.6 Stimulus of touch, pain, cold and heat are recognized differently because:
 A. For each sensation, different form of nerve impulse is generated
 B. Different receptors are present for detection of stimuli
 C. All nerves send their impulse to same part of brain
 D. Each stimulus acts on different parts of body
- Q.7 Pick out the pressure receptors.
 A. Chemoreceptors
 B. Photoreceptors
 C. Mechanoreceptors
 D. Thermoreceptors (MDCAT 2017)
- Q.8 Taste buds on the tongue are example of:
 A. Thermoreceptors
 B. Pressure receptors
 C. Photoreceptors
 D. Chemoreceptors (MDCAT 2018)
- Q.9 Which of following is associated with sense of touch?
 A. Paccinian's corpuscles
 B. Mechanoreceptors
 C. Merkel disks
 D. Both B and C

Neurons (Structure and Types)

- Q.10 Non-neuronal cells encapsulating mainly axons of peripheral neurons are:
 A. Microglia
 B. Oligodendrocytes
 C. Astrocytes
 D. Schwann's cell
- Q.11 Myelinated, single and long fiber that takes message towards the cell body is:
 A. Dendron
 B. Axon
 C. Dendrite
 D. Soma

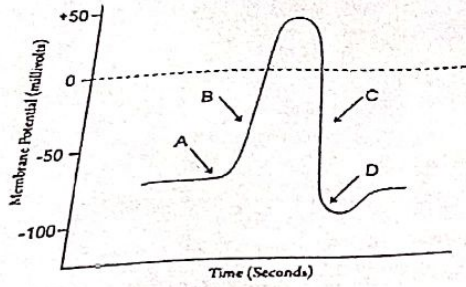
- Q.12 The largest number of the cell bodies of neurons are found in:
 A. Brain
 B. Spinal cord
 C. Sensory organs
 D. Effectors
- Q.13 Which of the following is not correct about myelin sheath?
 A. Composed of specialized lipids
 B. Responsible for saltatory conduction
 C. Conduct impulses
 D. Absent on nodes of Ranvier
- Q.14 Myelin sheath:
 A. Is found in all axons
 B. Is found in all dendron
 C. Speeds up conduction
 D. Is proteinaceous
- Q.15 Which one of the following are also known as efferent neurons?
 A. Sensory
 B. Associative
 C. Motor
 D. Mixed
- Q.16 Regeneration is possible in all parts of neurons except:
 A. Dendron
 B. Axon
 C. Dendrites
 D. Cell body
- Q.17 It is not true about cell body of neuron:
 A. Main nutritional part
 B. It contains axoplasm
 C. Biosynthesis of materials
 D. Regenerate axonal and dendrite fiber
- Q.18 Which organelle cannot be found in synaptic knob of a neuron?
 A. Mitochondria
 B. Ribosomes
 C. Secretory vesicles
 D. Nucleus
- Q.19 Which of the following is most abundant type of neurons in CNS?
 A. Sensory neurons
 B. Associative neurons
 C. Motor neurons
 D. Neuroglial cells
- Q.20 Which one of the following gives a tree-like appearance to neurons?
 A. Dendron
 B. Soma
 C. Dendrites
 D. Axons
- Q.21 Which of the following is not a part of neuron?
 A. Axon
 B. Dendrons
 C. Nissl's granules
 D. Synapse
- Q.22 _____ is considered as chief structural and functional unit of nervous system. (ETEA 2019)
 A. Cell
 B. Neuron
 C. Nephron
 D. Brain
- Q.23 Which one of the following is common to all neurons? (PMC 2020)
 A. A cell body which contains a nucleus
 B. Presence of node of Ranvier
 C. A thick myelin sheath
 D. Presence of Schwann cells
- Q.24 Neurons are cells adapted for the rapid transmission of electrical impulses. To do this, they have long thin processes called: (PMC 2020)
 A. Axons
 B. Myelin sheath
 C. Dendrites
 D. Schwann cell

Reflexes and Reflex Arc

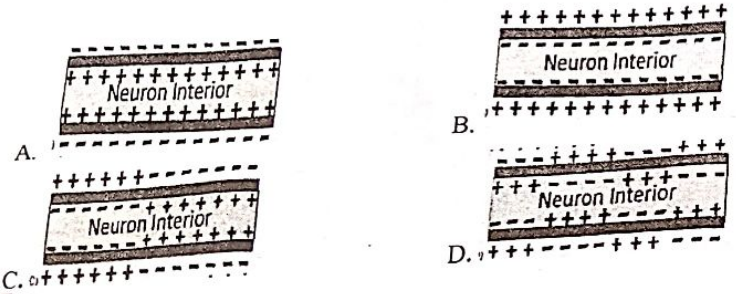
- Q.25 Which of the following is not a component of reflex arc?
 A. Afferent nerve
 B. Brain
 C. Efferent nerve
 D. Effectors

- Q.26 Which of the following describes the comprehensive pathway of reflex arc?
 A. Prick on finger → Sensory nerve → Medulla → Motor nerve → Arm Muscle
 B. Prick on finger → Sensory nerve → Spinal cord → Motor nerve → Finger muscles
 C. Prick on finger → Sensory nerve → Cerebrum → Motor nerve → Finger muscles
 D. Prick on finger → Sensory nerve → Cerebellum → Motor nerve → Finger muscle
- Q.27 The reflex action is the phenomena which only involves: (MDCAT 2019)
 A. Brain, receptors, spinal cord
 B. Receptors, neurons, brain
 C. Receptors, effectors and spinal cord
 D. Receptors and effectors
- Nerve Impulse**
- Q.28 Depolarization is the result of:
 A. Influx of K^+
 B. Influx of Na^+
 C. Efflux of K^+
 D. Efflux of Na^+
- Q.29 Which of the following causes the hyperpolarization across neurolemma?
 A. Distribution of charge
 B. Influx of Na^+
 C. Late closing of K^+ channels
 D. Outward diffusion of Na^+
- Q.30 Which one of the following sets of ions is necessary for transmission of nerve impulse?
 A. Na^+ and K^+
 B. Ca^{2+} and Na^+
 C. Ca^{2+} and K^+
 D. Na^+ and Mg^{2+}
- Q.31 Which of the following will restore original ion gradients and RMP after hyperpolarization in neurons?
 A. K^+ channels
 B. Na^+/K^+ pumps
 C. Na^+ channels
 D. Ca^{++} channels
- Q.32 Conduction of action potentials from one node of Ranvier to another in myelinated neurons is through: (MDCAT 2015)
 A. Hyperpolarization
 B. Depolarization
 C. Resting Membrane Potential
 D. Saltatory Conduction
- Q.33 In the following diagram of action potential in a neuron, 'x' depicts: (MDCAT 2015)
 A. Depolarization
 B. Repolarization
 C. Polarization
 D. Hyperpolarization
- Q.34 How many sodium ions are pumped out in response to two potassium ions transported into the membrane? (MDCAT 2018)
 A. 4
 B. 1
 C. 2
 D. 3
- Q.35 Depolarization of neuron is characterized by: (ETEA 2018)
 A. Na^+ into the axon and K^+ out of the axon
 B. K^+ into the axon and Na^+ out of the axon
 C. Na^+ and K^+ within the axon toward the axon terminal
 D. None of these
- Q.36 In an action potential, the permeability of sodium ions in the neuron increases due to: (MDCAT 2019)
 A. Repolarization
 B. The action of the acetylcholinesterase enzyme
 C. The opening of sodium channels/gates
 D. Sodium ions forming an ionic bonding
- Q.37 If stimulation is above _____, impulses travel to the brain along the sensory neuron. (MDCAT 2019)
 A. Action Potential
 B. Resting Potential
 C. Threshold
 D. Recovery Period

Q.38 Figure below shows different stages of action potential: What is represented by C?



- A. Depolarization
 B. Resting membrane potential
 C. Repolarization
 D. Hyperpolarization
- Q.39 Which of the following diagram best shows the resting membrane potential? (AJK 2019)



- Synapse**
- Q.40 Microscopic gap between the neurons is called:
 A. Synapse
 B. Synaptic cleft
 C. Collapse
 D. Pre-synapse membrane
- Q.41 Which ion is involved in release of Acetylcholine from pre-synaptic fiber into extracellular fluid?
 A. Calcium
 B. Potassium
 C. Sodium
 D. Magnesium
- Q.42 Neurotransmitter molecule binds to receptors that are located on:
 A. Synaptic knob
 B. Pre-synaptic membrane
 C. Post synaptic membrane
 D. Synaptic cleft
- Q.43 After the depolarization of post synaptic neurolemma, neurotransmitters are mostly:
 A. Taken up by Schwann cells
 B. Remain in synaptic cleft
 C. Degraded by enzymes
 D. Taken up by post synaptic membrane
- Q.44 Neurotransmitter secreted at synapse outside the central nervous system is:
 A. Dopamine
 B. Androgen
 C. Polypeptide
 D. Acetylcholine (MDCAT 2015)

- Q.45 For the impulse to transfer from presynaptic to post synaptic neuron, the substance required is:
 A. Sodium
 B. Potassium
 C. Protein
 D. Calcium (LUMMHC 2015)
- Q.46 The nerve impulse which jumps from node to node in myelinated neurons is called as:
 A. Resting membrane potential
 B. Threshold stimulus
 C. Saltatory nerve impulse
 D. Initial nerve impulse (MDCAT 2017)
- Q.47 When a nerve impulse jumps from one node of Ranvier to the next in a myelinated neuron, it is called _____.
 A. Saltatory conduction
 B. Resting potential
 C. Synapses
 D. Membrane potential (MDCAT 2018)
- Q.48 In nervous system, chemical messengers are called _____.
 A. Enzymes
 B. Resting potential
 C. Neurotransmitters
 D. Membrane potential (MDCAT 2018)
- Q.49 Acetylcholine and nor-adrenalin are two types of _____ used in our nervous system.
 A. Hormones
 B. Channel and carrier proteins in the cell membrane of a neuron
 C. Enzymes
 D. Neurotransmitters (MDCAT 2019)
- Q.50 The main neurotransmitter for synapses is _____ which lie outside the CNS.
 A. Choline
 B. Acetaldehyde
 C. Acetylcholine
 D. Phosphatidylcholine (MDCAT 2019)
- Q.51 Impulses jump across synapse in the form of chemical messenger such as:
 A. Glutamine
 B. Arginine
 C. Leucine
 D. Dopamine (AJK 2019)
- Q.52 A _____ is a junction between two neurons or between a motor neuron and a muscle cell.
 A. Impulse
 B. Axon
 C. Synapse
 D. Cleft (PMC 2020)
- Q.53 Which of following neurotransmitters affect sleep, mood and learning?
 A. Epinephrine and dopamine
 B. Nor-epinephrine and serotonin
 C. Dopamine and serotonin
 D. Epinephrine and nor-epinephrine
- Brain**
- Q.54 Sense of hearing is concerned with:
 A. Cerebral cortex
 B. Medulla
 C. Hypothalamus
 D. Cerebellum
- Q.55 In humans, this part is called as emotion center of brain:
 A. Thalamus
 B. Amygdala
 C. Hypothalamus
 D. Pons
- Q.56 Lobe are present in:
 A. Hypothalamus
 B. Cerebrum
 C. Pons
 D. Amygdala

Q.57 CSF circulates in all of the following parts except:

- A. Lateral ventricles
- B. Corpus callosum
- C. Dorsal ventricles
- D. Central canal

Spinal Cord

Q.58 Spinal cord terminates at the level of:

- A. Sacrum
- B. Coccyx
- C. 1st Lumber vertebra
- D. 2nd Lumber vertebra

Q.59 Grey matter is composed of:

- A. Schwann cells
- B. Neuron fibres
- C. Cell bodies of neuron
- D. Nissl's granules

Q.60 The primary function of spinal cord is to:

- A. Produce CSF
- B. Produce hormones
- C. Communicate two hemispheres
- D. Communicate brain with rest of body.

Peripheral Nervous System

Q.61 Preparing the body for the "fight-or-flight" response is the role of:

- A. Sympathetic nervous system
- B. Autonomic nervous system
- C. Parasympathetic nervous system
- D. Somatic nervous system

Q.62 Vagus nerve arises from _____ region.

- A. Cervical
- B. Lumbar
- C. Thoracic
- D. Pelvic

Q.63 Bundle of axons or dendrites bounded by connective tissue inside CNS is:

- A. Nerves
- B. Tracts
- C. Ganglia
- D. Nuclei

Q.64 Gray matter of spinal cord contains:

- A. Myelinated cell bodies only
- B. Myelinated cell processes only
- C. Cell bodies and unmyelinated cell processes
- D. Cell bodies and myelinated cell processes

Hormones

Q.65 The incorrect statement regarding hormones is:

- A. Endocrine secretion
- B. Initiate biochemical reaction
- C. Organic in nature
- D. Transported by blood

Q.66 Cholesterol serves as precursor of:

- A. Protein hormones
- B. Steroid hormones
- C. Adenoid hormones
- D. Glucocorticoids hormones

Q.67 Pick the system which transports hormone in the body:

- A. Endocrine system
- B. Nervous system
- C. Circulatory system
- D. Muscular system

Q.68 Chemically hormones are:

- A. Carbohydrates
- B. Proteins
- C. Steroids
- D. Both B and C

(ETEA 2019)

Endocrine System of Man (Hypothalamus)

Q.69 Hypothalamus produces all of the following except:

- A. CRF
- B. TRF
- C. ADH
- D. ACTH

Q.70 Which of the following neurotransmitters function, both as neurotransmitter and hormones, decreasing our perception of pain? (PMC 2020)

- A. Epinephrine
- B. Dopamine
- C. Serotonin
- D. Endorphins

Pituitary Gland

Q.71 Pituitary gland is attached to hypothalamus by:

- A. Hypophysis
- B. Axons
- C. Corpus callosum
- D. Infundibulum

Q.72 What results in production of large quantities of urine and great thirst?

- A. Lack of aldosterone
- B. Lack of oxytocin
- C. Lack of ADH
- D. Over-secretion of oxytocin

Q.73 Which of the following option correctly depicts neurosecretory hormone?

- A. Oxytocin and ADH
- B. ACTH and LH
- C. ICSH and TRF
- D. TSH and STH

Q.74 The pituitary gland is also called as:

- A. Adenohypophysis
- B. Hypophysis cerebri
- C. Neurohypophysis
- D. Epiphyses cerebri

Q.75 Term master gland is used for:

- A. Anterior pituitary
- B. Median pituitary
- C. Posterior pituitary
- D. Pituitary gland

Q.76 High level of TSH can be seen in all conditions except:

- A. Stress
- B. Low thyroxin in blood
- C. Growth and development
- D. Low TRF level

Q.77 All of the following are releasing factors except:

- A. CRF
- B. TRF
- C. PIF
- D. SRF

Q.78 Hyper functioning of anterior pituitary causes all except:

- A. Hyperthyroidism
- B. Gigantism
- C. Hypercortical steroidism
- D. Diabetes insipidus

Q.79 Diabetes insipidus is associated with:

- A. Insulin
- B. Glucagon
- C. Glucocorticoid
- D. Vasopressin

Q.80 Which one of the following is not a tropic hormone?

- A. TSH
- B. GH
- C. ACTH
- D. ADH

Q.81 High level of MSH can be seen in all except:

- A. Addison's disease
- B. Pregnancy
- C. Strong sunlight exposure
- D. Cushing's disease

Q.82 When secretion of ADH is increased, the amount of water reabsorbed is:

- A. Increased
- B. Maintained
- C. Decreased
- D. Has no effect on reabsorption

(AJK 2019)

Q.83 Pituitary gland releases _____ hormone and _____ hormone while ovaries produce _____ and progesterone. (NTS 2018)

- A. FSH, LH and estrogen
- B. Estrogen, FSH and LH
- C. LH, estrogen and FSH
- D. FSH, estrogen and LH

Q.84 In male luteinizing hormone is also known as _____. (ETEA 2019)

- A. ACTH
- B. ICSH
- C. TRF
- D. MSH

Thyroid Gland

- Q.85 Active thyroxin is also called:
 A. T₁ B. T₂
 C. T₃ D. T₄
- Q.86 Congenital under secretion of thyroxin causes:
 A. Grave's disease B. Myxedema
 C. Addison's disease D. Cretinism
- Q.87 Hormones involved in ossification of bones:
 A. Calcitonin B. Oxytocin
 C. Thyroxin D. Parathormone
- Q.88 High level of TSH can be seen in all conditions except:
 A. Stress B. Growth
 C. Brain differentiation D. High thyroxin level in blood
- Q.89 Brain cells fail to differentiate in:
 A. Cretinism B. Dwarfism
 C. Grave's disease D. Addison's disease
- Q.90 Metamorphosis in amphibians is under control of:
 A. Sex hormones B. Pituitary hormone
 C. Thyroid hormone D. Parathyroid hormone
- Q.91 Due to hypersecretion of thyroxin, there is increased BMR and exophthalmic goiter. This occurs in:
 A. Addison's disease B. Grave's disease
 C. Cushing's disease D. Diabetes mellitus
- Q.92 The deficiency of which micro-nutrient causes goiter formation? (ETEA 2019)
 A. Iron B. Zinc
 C. Iodine D. Sodium

Parathyroid Gland

- Q.93 Action of parathormone is antagonistic to:
 A. Insulin B. Calcitonin
 C. FSH D. TSH
- Q.94 Underactivity of parathyroid gland leads to:
 A. Diabetes B. Dwarfism
 C. Kidney stones D. Muscular tetany

Pancreas

- Q.95 Most portion of pancreas acts as:
 A. Endocrine B. Exocrine
 C. Mesocrine D. Autocrine
- Q.96 Which of the following statement is incorrect regarding insulin?
 A. Inhibits glycogen hydrolysis B. Increases glycolysis
 C. Converts glucose to protein D. Increases lipolysis
- Q.97 All are functions of glucagon except:
 A. Glucogenesis B. Gluconeogenesis
 C. Lipolysis D. Protein synthesis
- Q.98 Major endocrine cells in pancreas are:
 A. Alpha cells B. Beta cells
 C. Gamma cells D. Delta cells

- Q.99 Release of hormones from islets of Langerhans is under the influence of:
 A. STH B. ACTH
 C. Blood glucose level D. All A, B and C
- Q.100 Tumor in beta cells result in all except:
 A. More insulin production B. Low glucose in blood
 C. Destruction of alpha cells D. Low calcium in blood
- Q.101 Destruction of all beta cells in the pancreas would cause: (LUMMHC 2014)
 A. Glucagon secretion to stop and a decrease in blood glucose
 B. Glucagon secretion to stop and an increase in blood glucose
 C. Insulin secretion to stop and an increase in blood glucose
 D. Insulin secretion to stop and a decrease in blood glucose
 E. Insulin secretion to increase and a decrease in blood glucose
- Q.102 α -cells of pancreas secrete a hormone known as: (MDCAT 2015)
 A. Glucagon B. Gastrin
 C. Insulin D. Rennin
- Q.103 Which of the following is not secreted by thyroid gland?
 A. Thyroxin B. Triiodothyronine
 C. Calcitonin D. Glucagon
- Q.104 _____ hormone is antagonistic to insulin and causes increase in blood glucose level. (MDCAT 2016)
 A. Glucagon B. Calcitonin
 C. Nor-epinephrine D. Thyroxin
- Q.105 Beta cells of islets of Langerhans produce _____ hormone. (MDCAT 2016)
 A. Glucagon B. Pancreatic Juice
 C. Insulin D. Parathormone
- Q.106 Excess glucose is converted in the liver to glycogen in response to the hormone: (ETEA 2019)
 A. Glucagon B. Insulin
 C. Bile D. Both A and B

Adrenal Glands

- Q.107 Which of the following acts as a messenger in both chemical and nervous coordination?
 A. Acetylcholine B. Nicotine
 C. Dopamine D. Epinephrine
- Q.108 Which one of the following is only glucocorticoid?
 A. Cortisol B. Aldosterone
 C. Corticosterone D. Androgen
- Q.109 Which one of the following is exclusively a mineralocorticoid?
 A. Cortisol B. Aldosterone
 C. Corticosterone D. Androgen
- Q.110 All of the following are produced in adrenal gland, except:
 A. Epinephrine B. Cortisol
 C. Calcitriol D. Androgens
- Q.111 Aggressive behavior during routine life can be a symptom of:
 A. Hyperthyroidism B. Over production of STH
 C. Over production of adrenal cortex D. Over production of adrenal medulla

- Q.112 Peripheral vasoconstriction is a function of:
 A. Vasopressin B. Secretin
 C. Epinephrine D. Norepinephrine
- Q.113 One which is not due to adrenal cortical abnormality:
 A. Addison's disease B. Cushing's disease
 C. Failure to cope stress D. Tay-Sach's disease
- Q.114 A tumor in inner part of adrenal cortex in female results in all except:
 A. Sterility B. Male like characters in female
 C. Over androgen production D. High steroid level in blood
- Q.115 Action of epinephrine and nor-epinephrine differs on vessels supplying blood to:
 A. All parts of body B. Skin and gut
 C. Brain and muscles D. Skin and muscles
- Q.116 Stress conditions such as cold which normally be overcome, leads to collapse and death in:
 A. Cushing's disease B. Addison's disease
 C. Diabetes D. Cretinism
- Q.117 Adrenalin and nor-adrenalin promote the release of glucose from the liver:
 A. Protein B. Fats
 C. Glycogen D. Starch (KMDC 2014)
- Q.118 Epinephrine and norepinephrine are hormones produced by:
 A. Thyroid Gland B. Adrenal medulla
 C. Pituitary Gland D. Thymus gland
- Q.119 A man has to face interview, but during his first five minutes before the interview he experiences sweating, increased heart rate and respiration. Which hormone is responsible for his restlessness?
 A. Adrenocorticotrophic hormone B. Insulin and glucagon
 C. Epinephrine and nor-epinephrine D. Aldosterone (ETEA 2019)

Gonads

- Q.120 Which one of the following gland produces steroidal hormones?
 A. Pancreas B. Gut
 C. Hypothalamus D. Testes
- Q.121 If estrogen is deficient then possible reason would be less amount of:
 A. Testosterone B. FSH
 C. Oxytocin D. ICSH
- Q.122 In castrated male, there is under-secretion of:
 A. Testosterone B. FSH
 C. LTH D. STH
- Q.123 Testosterone is involved in production of primary sex organ in male:
 A. Before birth B. After puberty
 C. After birth D. Before puberty
- Q.124 Estrogen is produced from all except:
 A. Developing follicle B. Maturing follicle
 C. Follicle under FSH D. Ruptured follicle
- Q.125 A significant constant level of testosterone can be seen in male:
 A. Before birth B. After puberty
 C. After birth D. Before puberty

- Q.126 Deficiency of which hormone causes sterility in humans?
 A. Estrogen B. Testosterone
 C. Progesterone D. Both A and B
- Q.127 The hormones which works mostly on the basis of positive feedback mechanism:
 A. ADH B. Insulin
 C. Oxytocin D. Aldosterone
- Q.128 Which one of the following is a steroid hormone?
 A. Glucagon B. Epinephrine
 C. Thyroxin D. Estrogen (MDCAT 2014)

Feedback Mechanism

- Q.129 Normal serum level of hormones is controlled by:
 A. Target site B. Feedback mechanism
 C. Effector's response D. Precursor activation

Positive Feedback Mechanism

- Q.130 Which body function is controlled through positive feedback mechanism?
 A. Labour contractions B. Insulin production
 C. Body temperature D. Thyroxin release (PMC 2020)

Negative Feedback Mechanism

- Q.131 Which of the following hormones follow negative feedback mechanism?
 A. TSH B. Oxytocin
 C. ACTH D. Both A and C

ANSWER KEY

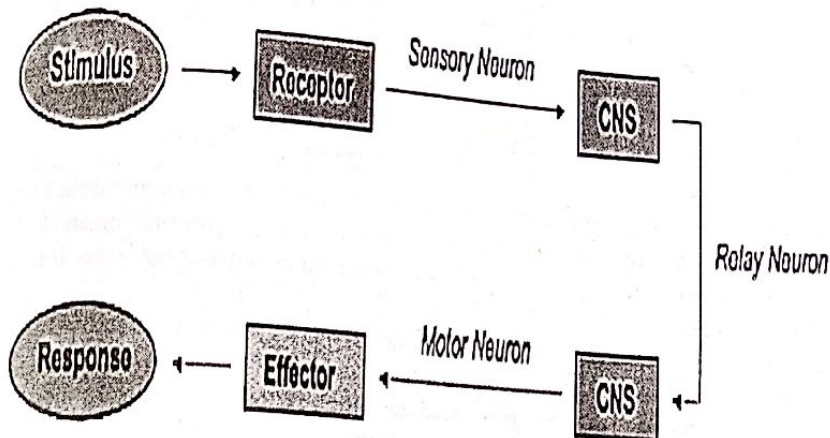
TOPIC-WISE MCQs & PAST PAPER

1	B	16	D	31	B	46	C	61	A	76	D	91	B	106	B	121	B
2	B	17	B	32	D	47	A	62	D	77	C	92	C	107	D	122	A
3	D	18	D	33	A	48	C	63	B	78	D	93	B	108	A	123	A
4	A	19	B	34	D	49	D	64	C	79	D	94	D	109	B	124	A
5	A	20	C	35	D	50	C	65	B	80	D	95	B	110	C	125	B
6	B	21	D	36	C	51	D	66	B	81	D	96	D	111	D	126	D
7	C	22	B	37	C	52	C	67	C	82	C	97	D	112	D	127	C
8	D	23	A	38	C	53	C	68	D	83	A	98	B	113	D	128	D
9	D	24	A	39	B	54	A	69	D	84	B	99	D	114	A	129	B
10	D	25	B	40	A	55	B	70	D	85	D	100	D	115	B	130	A
11	A	26	B	41	A	56	B	71	D	86	D	101	C	116	B	131	D
12	A	27	C	42	C	57	B	72	C	87	A	102	A	117	C		
13	C	28	B	43	C	58	D	73	A	88	D	103	D	118	B		
14	C	29	C	44	D	59	C	74	B	89	A	104	A	119	C		
15	C	30	A	45	D	60	D	75	A	90	C	105	C	120	D		

EXPLANATORY NOTES

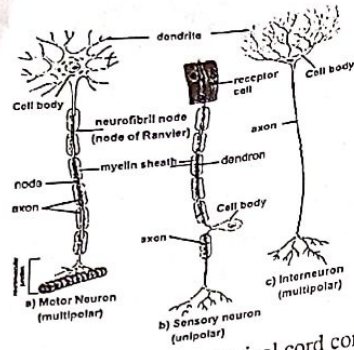
TOPIC-WISE MCQs & PAST PAPER MCQs

1.

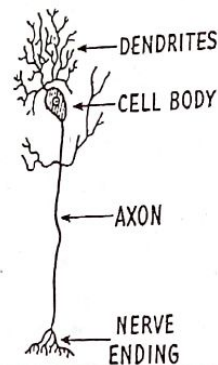


- Ectoderm mainly gives rise to nervous system and integumentary systems while mesoderm give rise to all other tissues of the body, including heart, the muscle system, the urogenital system, bones, and bone marrow and therefore the blood.
- Efferent neurons are meant to conduct messages from CNS to the effectors as they are emerging from CNS. That is why they are known as motor neurons.
- Effector is a structure or organ that brings about an action of 'effect' as a result of a stimulus received through a receptor which can come from the CNS or from a hormone.
- Mechanoreceptors detect stimuli of touch, pressure, hearing and equilibrium.
- Stimuli are always detected by specific receptors present in different parts of the body. Stimulus of touch, pain, cold and heat are recognized differently because these stimuli are detected by different receptors present in different parts of the body.
- Mechanoreceptors are in the skin and on other organs that detect sensations of touch. They are called mechanoreceptors because they are designed to detect mechanical sensations or differences in pressure.
- The taste receptors are located around the small structures known as papillae found on the upper surface of the tongue, these are chemoreceptors.
- Merkel disks are touch receptors. Receptors for touch and pressure are also called mechanoreceptors.
- Some cells are attached with the neurons, along the length of axon that are specialized for the production of myelin sheath; these are type of neuroglia cells in PNS named as Schwann cells.

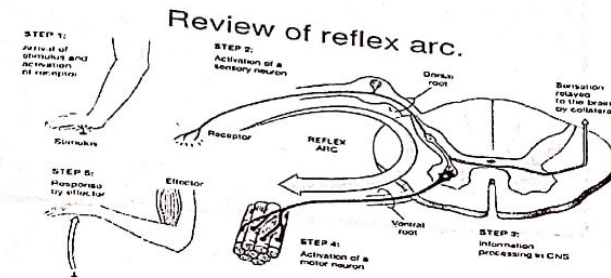
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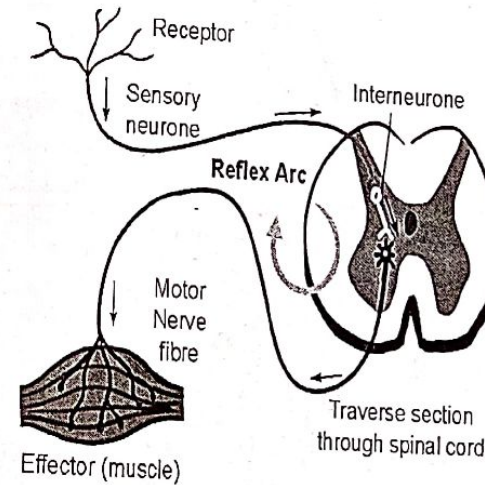
12. Brain contains the highest number of neurons and spinal cord comes on second number.
13. Myelin is a fatty substance that surrounds the axon of nerve cells, forming an electrically insulating layer. It facilitates the saltatory conduction of impulses but since, it is lipid in nature, it itself does not conduct impulses.
14. Myelin sheath is a mixture of proteins and lipids, and not present in all types of axons and dendron, and it is meant to increase the speed of conduction.
15. Efferent neuron is another name used for motor neurons which are meant for the conduction of messages from CNS to the effectors.
16. Extensions of neuron have the ability to regenerate only when if its cell body is intact because the nucleus of the neurons is present in it but cell body is devoid of that property.
17. Cell body of a neuron is main nutritional part. It is the part where biosynthesis of required materials is taking place. It also provides the genetic information for the regeneration of neuronal processes. Axoplasm is the cytoplasm of nerve axon.
18. Mitochondria, ribosomes and secretory vesicles are found in synaptic knob while nucleus is present in the cell body of neuron.
19. Associative neurons, also called inter-neurons or relay neurons are found exclusively in the central nervous system. It means that they are found in the brain and spinal cord and not in the peripheral segments of the nervous system.
- 20.



21. Axon, Nissl's granules and dendron are the parts of a neuron while synapse is a structure that permits a neuron to pass an electrical or chemical signal to another neuron or to the target effector cell/tissue.
22. Neurons are structural and functional unit of nervous system, nephrons are structural and functional unit of kidney.
23. The cell body or soma is the main nutritional part of the cell and is concerned with the biosynthesis of materials necessary for the growth and maintenance of the neuron.
24. Axons are the protoplasmic part of the cell body of neuron and are responsible for carrying the impulses away from the cell body.
25. The simplest arrangement of a reflex arc consists of the receptor, an interneuron, and an effector; together these units form a functional reflex group. Brain is, however, excluded in the reflex arc.
- 26.

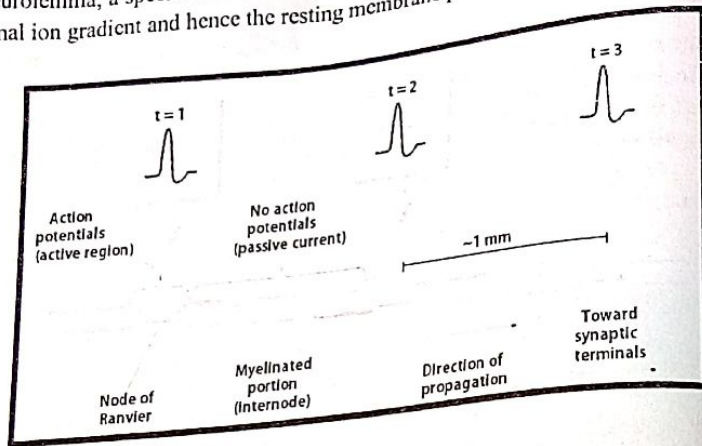


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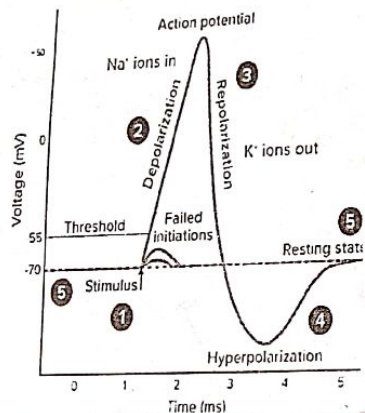
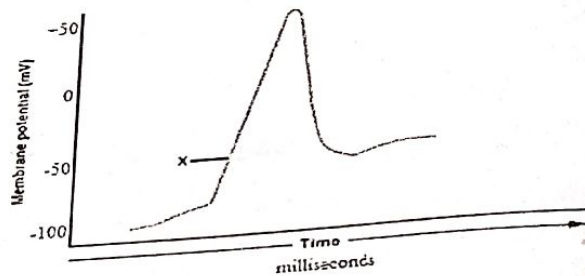


28. The influx of Na^+ increases the concentration of positively charged ions in the cell and causes depolarization, where the potential of the cell is higher than the cell's resting potential. The sodium channels close at the peak of the action potential, while potassium continues to leave the cell.

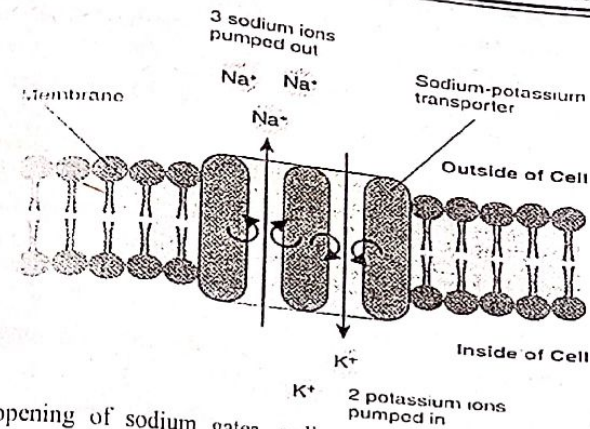
29. Hyperpolarization is a change in a cell's membrane potential that makes it more negative. It is the opposite to that of a depolarization. It is mainly caused by late closing of K^+ channels.
30. Sodium and potassium plays key role in the conduction of nerve impulse by their respective movement across the membrane.
31. In neurolemma, a specialized ATP dependent Na^+-K^+ pump is present which will restore original ion gradient and hence the resting membrane potential.
- 32.



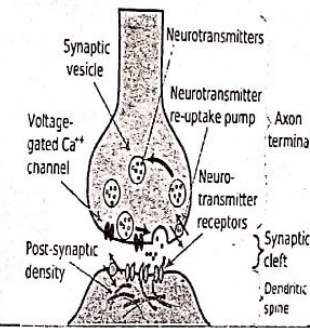
33.



34.



35. Due to opening of sodium gates, sodium ions move inward the neuron to cause depolarization.
36. The passage of nerve impulse is associated with increase in permeability of Na^+ due to the opening of Na^+ channels, moving inwards upsetting the potential momentarily, making the inside more positive than outside.
37. Minimum intensity of stimulus that is required to initiate a nerve impulse is called threshold stimulus.
38. Due to influx of sodium ions depolarization occurs, while due to outflux of potassium ions repolarization occurs.
39. During resting membrane potential membrane will be highly positive from outside and highly negative from inside.
40. In the nervous system, a synapse is a structure that permits a neuron to pass an electrical or chemical signal to another neuron or to the target effector cell. Synaptic cleft is the space between neurons at a nerve synapse across which a nerve impulse is transmitted by a neurotransmitter.
41. When the action potential reaches the nerve terminal, voltage dependent Ca^{2+} channels will open and Ca^{2+} rushes into the neuron terminal due to a greater extracellular concentration, causing release of neurotransmitter molecules from pre-synaptic membrane into synaptic cleft.
- 42.



43. After the depolarization of postsynaptic neurolemma, neurotransmitters are mostly degraded by the enzymes or taken up actively by pre-synaptic neurolemma. For example, acetylcholinesterase is an enzyme that degrades acetylcholine after synaptic transmission.
44. Acetylcholine is neurotransmitter for synapse outside CNS while adrenalin, nor-epinephrine, Serotonin and dopamine for synapse in CNS.
45. Calcium (Ca^{2+}) is a vital element in the process of neurotransmitter release: when Ca^{2+} channels are blocked, neurotransmitter release is inhibited. When the action potential reaches the nerve terminal, voltage-dependent Ca^{2+} channels open and Ca^{2+} rushes into the neuron terminal due to a greater extracellular concentration.
46. The nerve impulse is conducted from node to node in jumping manner. This kind of jumping nerve impulse is called saltatory impulse.
47. The nerve impulse is conducted from node to node in jumping manner. This kind of jumping nerve impulse is called saltatory impulse.
48. Neurotransmitters are endogenous chemicals acting as signaling molecules that enable the transmission of nerve impulse.
49. Neurotransmitters are endogenous chemicals acting as signaling molecules that enable the transmission of nerve impulse. Acetylcholine is neurotransmitter for synapse outside CNS while adrenalin, nor-epinephrine, serotonin and dopamine in CNS.
50. Acetylcholine is an organic chemical that functions in the brain as a neurotransmitter i.e. a chemical message released by nerve cells to send signals to other cells, such as neurons, muscle cells and gland cells.
51. Glutamine, arginine and leucine are amino acids, while dopamine is a neurotransmitter
52. Consecutive neurons are so arranged that the axon endings of one neuron are connected to the dendrites of the next neuron. There is no cytoplasmic connection between the two neurons and microscopic gaps are left between them. Each of these contact points is known as synapse.
53. Dopamine and serotonin affect sleep, mood, attention and learning.
54. Cerebral cortex contains primary sensory areas where signals originating in sensory organs such as eyes and ears are received and converted into subjective impressions, such as light and sound.
55. Amygdala is part of limbic system and it receives sensation for pleasure, punishment, fear, rage and sexual arousal.
56. Cerebrum is the largest part of brain. It has four lobes.
57. Cerebrospinal fluid is present between ventricles of brain and central canal of vertebral column.
58. The spinal cord extends from the occipital bone of the skull until it terminates near the second lumbar vertebra.
59. Grey matter is mainly composed of cell bodies of neurons while white matter is composed of myelin sheath.

60. The spinal cord functions primarily in the transmission of nerve signals from the motor cortex to the body, and from the afferent fibers of the sensory neurons to the sensory cortex. It is also a center for communication between body and brain.
61. Fight and flight response is also known as emergency response of body. Sympathetic nervous system that is subdivision of peripheral nervous system prepares body for emergency response.
62. Nervous system that is subdivision of peripheral nervous system prepares body for Vagus nerve is part of parasympathetic subdivision and it arises from pelvic region.
- 63.

Tracts	Bundle of axons or dendrites bounded by connective tissue in CNS
Nerves	Bundle of axons or dendrites bounded by connective tissue in PNS
Nuclei	Collection of cell bodies of neurons in CNS
Ganglia	Collection of cell bodies of neurons in PNS

64. Gray matter of spinal cord contains interneurons and its fibers are nonmyelinated.
65. Hormones are the organic secretion produced by the endocrine glands, which are transported to the target tissue via blood stream, and they cannot initiate a chemical reaction, but they can only regulate.
66. Cholesterol is the precursor of the five major classes of steroid hormones: progesterone, glucocorticoids, mineralocorticoids, androgens, and estrogens. These hormones are powerful signaling molecules that regulate many functions.
67. Endocrine glands are ductless glands and release their secretions into blood. They reach the target site through bloodstream.
68. No hormone is carbohydrate in nature. With respect to chemical nature, all hormones are protein in nature except few, which are steroid in nature.
69. Adrenocorticotrophic hormone is a polypeptide tropic hormone produced and secreted by the anterior pituitary gland.
70. The endorphins are peptides that function as both neurotransmitters and hormones, decreasing our perception of pain.
71. Pituitary gland is attached to hypothalamus by a stalk called infundibulum, which is composed of blood vessels and the fibers of neurosecretory cells.
72. ADH is responsible for reabsorption of H_2O from collecting tubules and lack of ADH results in production of large quantities of urine and increased thirst.
73. Neurosecretory cells in the hypothalamus release oxytocin and ADH into the posterior lobe of the pituitary gland. These hormones are stored or released into the blood.
74. The term hypophysis (from the Greek for "lying under")-another name for the pituitary-refers to the gland's position on the underside of the brain.
75. The anterior pituitary gland is often dubbed the "master gland" because its hormones control other parts of the endocrine system, namely the thyroid gland, adrenal glands, ovaries, and testes.

76. More the thyrotrophin releasing (TRF) factor from hypothalamus more will be thyroid Stimulating Hormone (TSH). TSH is released under stress condition; its level is high during growth and development.
77. Prolactin-inhibiting hormone (PIH) inhibits the secretions of prolactin hormone from anterior lobe of pituitary gland.
78. Prolactin-inhibiting hormone (PIH) inhibits the secretions of prolactin hormone from anterior lobe of pituitary gland.
79. Diabetes insipidus is due to low level of ADH.
80. Under secretion of vasopressin or ADH causes diabetes insipidus, which is characterized by excessive production of diluted urine and frequent thirst.
81. The hormones released from anterior lobe of pituitary glands are called tropic hormones as they control the secretions from other glands in the body.
82. In Cushing's disease, too much cortical hormone is produced. MSH is produced from median lobe of pituitary gland and it is produced under sun light, its level is increased during pregnancy and in Addison's disease.
83. During low blood osmotic concentration ADH secretion will increase and act on distilled part of nephron to increase water reabsorption.
84. FSH and LH collectively called gonadotrophic hormones, are released from anterior lobe of pituitary and act on gonads for further secretions.
85. Luteinizing hormone causes ovulation in human females. In male, it is named as ICSH and stimulates interstitial cells of testis for testosterone production.
86. T_4 is main thyroid hormone, also called as thyroxin, it is tetraiodothyronin. T_3 is produced in small quantity, is unstable, and is degraded during its travelling.
87. Congenital under secretion of thyroxin results in a severe hypothyroidism in infants called cretinism.
88. Calcitonin acts to reduce blood Ca^{2+} , opposing the effects of parathyroid hormone, by deposition of Ca^{2+} in the bones.
89. Low level of thyroxin stimulates hypothalamus to release thyrotrophin releasing factor, which stimulates the production of thyroid stimulating hormone from anterior lobe of pituitary gland. TSH acts on thyroid gland, which starts producing thyroxin. If the level of thyroxin is already high, then the TSH will not be produced.
90. Cretinism is a condition of severely stunted physical and mental growth owing to untreated congenital deficiency of thyroid hormone (congenital hypothyroidism) usually owing to maternal hypothyroidism.
91. Frog metamorphosis is regulated by thyroid hormones (THs), promoting the remodeling of the aquatic larvae into an adult tetrapod, means that the dramatic structural and functional changes of larval tissues can be readily applied as parameters reflecting endocrine disruption.
92. Grave's disease is an autoimmune disease that affects the thyroid. It frequently results in increased BMR. It also often results in an enlarged thyroid.

93. Iodine is involved in formation of thyroxin. Deficiency of iodine means deficiency of thyroxin.
94. Calcitonin brings about release of calcium ions from bones while parathormone removes calcium from blood to bone.
95. Muscular tetany results from low calcium in blood plasma. It can be due to under secretion of parathormone.
96. The pancreas is divided into an exocrine portion and an endocrine portion (islets of Langerhans). The exocrine portion, comprising 85% of the mass of the pancreas, and the endocrine portion which secrete various hormones into the bloodstream.
97. Insulin is responsible to decrease glucose by the conversion of glucose into glycogen. It is also responsible for increased glucose uptake by the cell and converts glucose into lipids and proteins.
98. Glucagon strongly opposes the action of insulin; it raises the concentration of glucose in the blood by promoting breakdown of glycogen by stimulating production of glucose from lipids.
99. Pancreatic islets house two major cell types, each of which produces a different endocrine product: Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.
100. Release of hormones from islets of Langerhans is under control of the pituitary trophic hormones, STH and ACTH and also responds directly to the level of blood glucose.
101. Beta cells have no relation with calcium regulation.
102. Due to destruction of Beta cells of pancreas activity of alpha-cells will increase, due to which glucose level in blood will increase.
103. Pancreatic islets house two major cell types, each of which produces a different endocrine product. Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.
104. Thyroxin and Calcitonin are released by thyroid gland while glucagon is released by pancreas.
105. Glucagon is essentially antagonistic to insulin and causes an increase in blood glucose levels. It does this mainly by:
 - Promoting breakdown of glycogen to glucose in the liver and muscles.
 - Increasing the rate of breakdown of fats.
 - *Pancreatic islets house two major cell types, each of which produces a different endocrine product. Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.*
106. Insulin and glucagon are antagonistic hormones.
107. Epinephrine or adrenaline produced both by adrenal gland as well as by brain and acts both as a hormone and neurotransmitter.
108. Cortisol brings about the increase in blood glucose level. It is principal glucocorticoid.

109. Cortisol bring about the increase in blood glucose. Corticosterone is responsible for the increase of mineral and glucose level in blood. Aldosterone is principal mineralocorticoid, brings about increase in mineral level in blood mainly Na^+ .
110. Epinephrine is produced form adrenal medulla. Cortisol and androgens are produced from adrenal cortex. Calcitriol is produced form kidneys.
111. Over secretion of adrenal medullary hormones (adrenaline and noradrenaline) may cause hypertension and aggressive behavior during routine life.
112. Epinephrine is a stimulator of metabolic activities, bronchial dilation, and increased blood flow to skeletal muscles and the heart. But norepinephrine has the greater influence on peripheral vasoconstriction. The net effect is the rise in blood pressure.
113. Tay-Sach's is due to abnormality in lysosomes non-functioning.
114. Tumor in adrenal cortex leads to the excessive secretions of androgen hormone, which results in the development of secondary sex characters in female and results in high steroid level in the blood. It has no role in sterility of an individual.
115. Adrenaline dilates the blood vessels in certain parts of the body such as skeletal muscles. But nor-adrenaline constricts blood vessels in certain parts of the body such as gut, so the effect of the two hormones is synergistic in raising blood pressure.
116. Destruction of the adrenal cortex such as, occurs in Addison's disease, will lead to general metabolic disturbance, in particular weakness of muscle action and loss of salts.
117. These hormones provide glucose to handle stress.
118. Epinephrine and norepinephrine are the hormones of adrenal medulla during emergency conditions.
119. Hormones of adrenal medulla are called as emergency hormones. Both will increase blood pressure during an emergency case.
120. Mammalian testes produce testosterone, which is steroid in nature. Pancreas produces insulin and glucagon, which are protein hormones. Hypothalamus produces neursecretions, which are polypeptide in nature.
121. Follicle-stimulating hormone (FSH) is secreted by the anterior pituitary in response to gonadotropin-releasing hormone (GnRH) released by the hypothalamus. In women, LH stimulates estrogen production from the ovary.
122. At puberty, testosterone helps in the development of secondary sex characteristics in males. When testes are surgically removed then the level of testosterone is lower and leads to sterile male.
123. In fetus, the testosterone hormone initiates the development of primary sex organs but at puberty its secretion helps in the development of secondary sex characters.
124. Estrogen is produced from developing follicles under the action of FSH. Ruptured follicles are responsible for progesterone production.
125. After puberty, the supply of LH (ICSH) is constant and therefore the level of testosterone remains constant.
126. Deficiency of estrogen causes sterility in females while deficiency of testosterone causes sterility in males.

127. Positive feedback system, the output enhances the original stimulus. A good example of a positive feedback system is childbirth. During labour, a hormone called oxytocin is released that intensifies and speeds up contractions.

128.

Chemical Nature of Hormones	Glands	Examples
Protein	Islets of Langerhans	Insulin, Glucagon
Polypeptides	Posterior pituitary	
Amino Acids and Derivatives	Thyroid, Adrenal Medulla	ADH, Oxytocin
Steroid	Gonads, Adrenal Cortex	T3, T4, Epinephrine, Norepinephrine

129. Most hormones are regulated by feedback mechanisms. A feedback mechanism is a loop in which a product feeds back to control its own production. Most hormone feedback mechanisms involve negative feedback loops. Negative feedback keeps the concentration of a hormone within a narrow range.
130. Stretch-receptive neurons in the cervix respond to this extension by signaling the hypothalamus, which response by triggering the release of oxytocin that stimulates more and stronger uterine contractions.
131. Negative feedback mechanism is crucial for maintenance of homeostasis. Many hormones such as TSH, ACTH etc. follow this type of feedback mechanism. Oxytocin acts by positive feedback mechanism during process of childbirth.

Introduction and Characteristics Kingdom Animalia

- Q.1 All are the features of kingdom animalia except:
A. Heterotroph
B. Organic synthesis
C. Eukaryotes
D. Multicellular
- Q.2 A feature shared by all animals:
A. Motile
B. Aquatic lifestyle
C. Locomotion by limbs
D. Heterotrophy
- Criteria for Animal Classification**
- Q.3 Animals of grade radiata are:
A. Diploblastic
B. Acoelomate
C. Triploblastic
D. Pseudocoelomate
- Q.4 Reproductive system arises from:
A. Germ layer
B. Ectoderm
C. Mesoderm
D. Endoderm
- Q.5 Pseudocoelom develops from:
A. Blastostyle
B. Blastocoel
C. Blastocyst
D. Mesoderm
- Q.6 Reproductive system, excretory system, circulatory system and respiratory system developed from:
A. Ectoderm
B. Endoderm
C. Mesoderm
D. Ectoderm and endoderm
- Q.7 Bilaterally symmetrical animals are:
A. Lesser developed
B. Lacking mesoderm
C. Placed in one phylum only
D. Triploblastic
- Q.8 In coelomate the layer that surround endoderm is:
A. Coelomic Epithelium
B. Ectoderm
C. Visceral Mesoderm
D. Parietal Mesoderm
- Q.9 All are correct about acoelomates except:
A. Sac type digestive system
B. Well-developed respiratory system
C. Parenchyma fill the body space
D. Well-developed excretory system
- Q.10 A body cavity is absent in:
A. Acoelomates
B. Pseudocoelomates
C. Acoelomates and Pseudocoelomates
D. Coelomates
- Q.11 Which of the following are pseudocoelomates?
A. Platyhelminthes
B. Echinoderms
C. Molluscs
D. Aschelminthes
- Q.12 A fluid filled cavity which is mesodermal in origin but absent in nematodes is:
A. Coelom
B. Gastrocoel
C. Pseudocoelom
D. Sponogocoel
- Q.13 Everything is true about coelom except:
A. Found between body wall and gut
B. Fluid filled
C. Lined by mesoderm
D. Bound internally by cuticle of intestine

- Q.14 Acoelomates do not lack:
A. Coelom
B. Mesoderm
C. Special transport system
D. Coelomic fluid
- Q.15 In coelomates, gut is lined externally by:
A. Visceral mesoderm
B. Parietal mesoderm
C. Splanchnic mesoderm
D. Endoderm
- Q.16 Which system is more developed in acoelomates?
A. Excretory system
B. Respiratory system
C. Digestive system
D. Osmoregulatory system
- Q.17 Spiral and determinate type cleavage is present in:
A. Pinworm
B. Star fish
C. Cake urchin
D. Amphioxus
- Q.18 Indeterminate cleavage is not a characteristic of:
A. Echinodermata
B. Mollusca
C. Chordata
D. Hemichordata
- Q.19 Animals of grade _____ can be divided into equal halves in many planes.
A. Multigenecity
B. Polymorphism
C. Radiata
D. Bilateria
- Q.20 _____ cells of cnidarians give rise to nematocyst.
A. Ectodermal
B. Endodermal
C. Mesodermal
D. Peridermal
- Invertebrate Phyla**
- Q.21 The animal which has false coelom is:
A. *Spongilla*
B. *Obelia*
C. Hookworm
D. *Planaria*
- Q.22 An acoelomate is:
A. Flatworm
B. Molluscs
C. Annelids
D. Earthworm
- Q.23 Sponges have special mobile cells called:
A. Pinacocytes
B. Flagellated cells
C. Choanocytes
D. Amoebocytes
- Q.24 An animal found from ocean was observed to have no tissue organization. It is most likely to be the member of phylum:
A. Porifera
B. Coelenterate
C. Echinodermata
D. Hemichordate
- Q.25 The skeleton of sponges consists of:
A. Carbonate of lime
B. Silicon
C. Calcium carbonate
D. Carbonate of lime & silicon
- Q.26 Body of porifera is tubular which is opened at its anterior end called:
A. Culum
B. Osculum
C. Sponogocoel
D. Ostia
- Q.27 All are the uses of sponges except:
A. Washing and bathing
B. Air pollution indicator
C. In surgical operations
D. To absorb sound waves
- Q.28 Asexual reproduction is more common in cnidarians. It is performed by:
A. Budding
B. Regeneration
C. Rarely by fragmentation.
D. All of these

- Q.29 The existence of a single species in more than two morphological forms (individual types) is termed as:
 A. Mutagenesis
 C. Polymorphism
 B. Metagenesis
 D. Unicellular organism
- Q.30 _____ develops gonads in which egg or sperms are formed.
 A. Polylys
 C. Gastrozooids
 B. Medusae
 D. Blastostyle
- Q.31 It is not the importance of coral reef:
 A. Provide ecosystem to marine life
 C. Provide breeding habitat for fishes
 B. Used as ornaments
 D. Used as sound absorber
- Q.32 The animals in grade bilateria and triploblastic are all except:
 A. Platyhelminthes, nematode
 C. Arthropoda, and chordate
 B. Annelida, mollusca
 D. Cnidaria
- Q.33 Gastrovascular cavity of coelenterates perform following function:
 A. Digestion
 C. Excretion
 B. Respiration
 D. All of these
- Q.34 The nematocysts are the organs of defense in _____.
 A. Coelenterata
 C. Annelida
 B. Echinodermata
 D. Tracheophytes
- Q.35 It is not true for Phylum Platyhelminthes:
 A. Bilaterally symmetrical
 C. Dorsoventrally compressed body
 B. Triploblastic metazoan
 D. Radially symmetrical body
- Q.36 The body of Aschelminthes is covered by a hard layer of:
 A. Chitin
 C. Cilia
 B. Cuticle
 D. Spongin
- Q.37 _____ is a human parasite commonly known as pinworm.
 A. *Fasciola hepatica*
 C. *Enterobius vermicularis*
 B. *Taenia solium*
 D. *Aurelia aurita*
- Q.38 The nervous system in Aschelminthes consists of a nerve ring which encircles the:
 A. Mouth
 C. Larynx
 B. Pharynx
 D. Anus
- Q.39 Molluscs are soft bodied, triploblastic animals, most of them are protected by a shell of calcium carbonate secreted by:
 A. Mantle
 C. Mesoderm
 B. Ectoderm
 D. Ectoderm
- Q.40 The internal opening of nephridia is called:
 A. Nephridiopore
 C. Metanephridia
 B. Nephrostome
 D. Nephropore
- Q.41 Locomotory organs are _____ in earthworm and _____ in *Neries* respectively.
 A. Setae, parapodia
 C. Setae
 B. Parapodia, setae
 D. Setae, chaetae
- Q.42 The most successful group and the largest phylum of the animals:
 A. Phylum Mollusca
 C. Phylum Annelida
 B. Phylum Porifera
 D. Phylum Arthropoda
- Q.43 Natural silk is not:
 A. A protein
 C. Obtained from an insect
 B. Produced by modified salivary glands
 D. Glycolipid in nature

- Q.44 Scavenger insects may eat:
 A. Dead matter present on organism
 C. Dead plant matter only
 B. Dead animals and plants
 D. Living animals only
- Q.45 Members of this phylum are exclusively marine:
 A. Porifera
 C. Mollusca
 B. Dead animals and plants
 D. Living animals only
- Q.46 The organs of locomotion in echinoderms are:
 A. Muscle feet
 C. Parapodia
 B. Cnidaria
 D. Echinodermata
- Q.47 Water enters the water vascular system through:
 A. Radial canal
 C. Ostia
 B. Jet propulsion
 D. Tube feet
- Q.48 Fate of the blastomeres is foretold in:
 A. Echinoderms
 C. Arthropods
 B. Hemichordates
 D. Chordates
- Q.49 Which one of the following is the primary host of liver fluke? (MDCAT-2014)
 A. Man
 C. Sheep
 B. Snail
 D. Dog
- Q.50 Which one of the following is an example of a free-living carnivorous flatworm? (MDCAT-2014)
 A. Liver fluke
 C. *Dugesia*
 B. Tapeworm
 D. *Schistosoma*
- Q.51 *Ascaris* is which one of the following? (MDCAT-2014)
 A. Ectoparasite
 C. Intestinal parasite
 B. Respiratory tract parasite
 D. Urinogenital tract parasite
- Q.52 Polymorphism is a feature exhibited by members of: (MDCAT-2014)
 A. Coelenterates
 C. Arthropoda
 B. Porifera
 D. Platyhelminthes
- Q.53 _____ is a triploblastic organism. (MDCAT-2015)
 A. Jelly Fish
 C. Sea Anemone
 B. Tapeworm
 D. Corals
- Q.54 In arthropods, the body cavity is in the form of: (MDCAT-2015)
 A. Coelom
 C. Haemocoel
 B. Pseudocoelom
 D. Enteron
- Q.55 _____ is also called liver fluke. (MDCAT-2015)
 A. *Dugesia*
 C. *Taenia*
 B. *Fasciola*
 D. Coral
- Q.56 Name of common gut roundworm parasite of human and pigs. (MDCAT-2015)
 A. *Ascaris lumbricoides*
 C. *Lumbricus terrestris*
 B. *Pheretima posthuma*
 D. *Hirudo medicinalis*
- Q.57 _____ is a good example of polymorphism. (MDCAT-2015)
 A. *Hydra*
 C. Starfish
 B. *Obelia*
 D. *Euplectella*
- Q.58 In radial symmetry, all body parts are arranged around the central axis. Radial symmetry represents _____ mode of life. (MDCAT-2016)
 A. Sessile
 C. Streamlined
 B. Active
 D. Parasitic

PMC Topic-6

Diversity Among Animals

- Q.59 Pseudo-coelomates have a body cavity but it is not true coelom. Which one of the following is included in the group? (MDCAT-2016)
 A. Planaria
 B. Earthworm
 C. Tapeworm
 D. Ascaris
- Q.60 *Taenia* is an endoparasite of human, pig and cattle, which belongs to phylum. (MDCAT-2016)
 A. Cnidaria
 B. Annelida
 C. Aschelminthes
 D. Platyhelminthes
- Q.61 Body of _____ consists of segments called proglottids, which contains mainly sex organs. (MDCAT-2016)
 A. Planaria
 B. *Fasciola*
 C. *Ascaris*
 D. Tapeworm
- Q.62 _____ is a common parasite of the intestine of human and pig, which belongs to phylum nematode. (MDCAT-2016)
 A. *Taenia solium*
 B. *Ascaris lumbricoides*
 C. *Schistosoma*
 D. *Fasciola hepatica*
- Q.63 Snails are the intermediate hosts in: (MDCAT-2017)
 A. *Fasciola hepatica*
 B. *Schistoma*
 C. *Taenia solium*
 D. *Ancylostoma duodenale*
- Q.64 _____ is an intestinal parasite of man belonging to phylum nematoda. (MDCAT-2017)
 A. *Taenia solium*
 B. *Ascaris lumbricoides*
 C. *Wucheroni abancrofti*
 D. *Schistoma*
- Q.65 Following group is the example of acoelomates: (MDCAT-2018)
 A. Platyhelminthes
 B. Aschelminthes
 C. Molluscs
 D. Annelids
- Q.66 The larva formed during the life cycle of Annelida is: (ETE A-2019)
 A. Glochidium larva
 B. Bipinnaria larva
 C. Trochophore larva
 D. Tornaria larva
- Q.67 Platyhelminthes are: (ETE A-2019)
 A. Bilaterally symmetrical and diploblastic
 B. Bilaterally symmetrical and triploblastic
 C. Radially symmetrical and triploblastic
 D. Radially symmetrical and diploblastic
- Q.68 *Pheretima posthuma* is the scientific name of: (LUMHS-2015)
 A. Planaria
 B. Liver fluke
 C. Earth worm
 D. Tape worm
 E. *Ascaris*
- Q.69 Which group of organisms has the following features? (NTS-2017)
 1. Three pairs of jointed legs
 2. Three-part segmented body
 3. One pair of antennae
 A. Arachnoids
 B. Crustaceans
 C. Insects
 D. Myriapods
- Q.70 Platyhelminthes means: (NTS-2017)
 A. Flat worms
 B. Round worms
 C. Segmented worms
 D. None

Vertebrate Phyla

Diversity Among Animals

- Q.71 Reptiles flourished throughout _____ era.
 A. Cenozoic
 B. Devonian
 C. Proterozoic
 D. Mesozoic
- Q.72 Birds do not have teeth so the function of teeth is performed by:
 A. Beak
 B. Pharynx
 C. Stomach
 D. Gizzard
- Q.73 Which of them is not poikilotherm?
 A. Spiny ant eater
 B. Lizard
 C. Crocodile
 D. Snake
- Q.74 The lower jaw is composed of only one large bone:
 A. Reptiles
 B. Amphibian
 C. Chondrichthyes
 D. Mammals
- Q.75 Opossum and koala bear belongs to sub-class: (ETE A-2019)
 A. Prototheria
 B. Eutheria
 C. Metatheria
 D. Monotremata
- Q.76 The table shows some characteristics of four different vertebrates. Which vertebrate is a reptile? (NTS-2017)
- | | Fins | Legs | Scales | Hair |
|---|------|------|--------|------|
| A | ✓ | × | ✓ | × |
| B | × | ✓ | ✓ | × |
| C | × | ✓ | × | × |
| D | × | ✓ | × | ✓ |
- Q.77 All chordates share these features expect:
 A. Notochord
 B. Gill slits
 C. Post anal tail
 D. Vertebral column
- Q.78 The central nervous system of chordates is:
 A. Ventral
 B. Ventral and hollow
 C. Lateral
 D. Dorsal and hollow
- Q.79 *Balanoglossus* and *Saccoglossus* are members of:
 A. Echinodermata
 B. Annelida
 C. Nematoda
 D. Hemichordata

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

1	B	16	A	31	D	46	D	61	D	76	B
2	D	17	A	32	D	47	D	62	B	77	D
3	A	18	B	33	D	48	C	63	A	78	D
4	C	19	C	34	A	49	C	64	B	79	D
5	B	20	A	35	D	50	C	65	A		
6	C	21	C	36	B	51	C	66	C		
7	D	22	A	37	C	52	A	67	B		
8	C	23	D	38	B	53	B	68	C		
9	B	24	A	39	A	54	C	69	C		
10	A	25	D	40	B	55	B	70	A		
11	D	26	B	41	A	56	A	71	D		
12	A	27	B	42	D	57	B	72	D		
13	D	28	D	43	D	58	A	73	A		
14	B	29	C	44	B	59	D	74	D		
15	A	30	B	45	D	60	D	75	C		

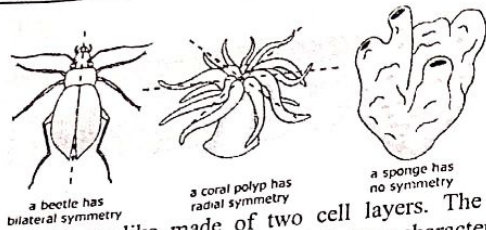
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

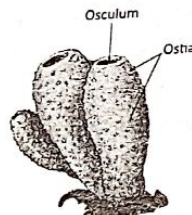
- Organic synthesis is referred to as photosynthesis in which inorganic molecules (water and carbon dioxide) are converted into organic molecule (Glucose). This process takes place in Autotrophs.
- Some animals, such as sponges, are sessile. Animals occupy aquatic as well as terrestrial habitats and not all animals have limbs, such as invertebrates. However, all animals are heterotrophs.
- Grade radiata includes only one phylum; Cnidaria. These animals are always diploblastic and have gastrovascular cavity with sac type digestive system.
- Ectoderm form skin and nervous system, Endoderm form digestive system and rest of the systems in triploblastic animals are formed from mesoderm including reproductive system.
- The body cavity that is formed from Blastocoel (cavity that is formed at blastula stage of developing embryo) is called pseudocoelom.
- Ectoderm forms skin and nervous system. Endoderm forms lining of digestive system and rest of the systems in triploblastic animals originate from mesoderm.
- All bilateral symmetrical animals are triploblastic.
- Coelom (body cavity) is formed due to splitting of mesoderm at embryonic stages. Its outer layer is called parietal layer which underlines the body wall, while inner layer of mesoderm is called visceral layer that surrounds the endoderm.
- Acoelomate includes animals of Phylum Platyhelminthes in which respiratory and circulatory system is absent. Gaseous exchange takes place directly through body surface.
- Acoelomates are those animals in which there is no body cavity or space between body wall and digestive system. This group includes only one phylum Platyhelminthes.
- Aschelminthes or nematodes are pseudocoelomates.
- Coelom is true body cavity, which is always formed from mesoderm. Nematodes are Pseudocoelomates.
- Coelom is internally lined by visceral layer of mesoderm. In pseudocoelomates body cavity is internally bound by cuticle of intestine.
- Acoelomates are triploblastic animals in which all the three germinal layers ectoderm, mesoderm and endoderm are present.
- During embryonic development, mesoderm splits into outer parietal layer that internally lines the body wall and inner visceral layer (mesoderm) that externally surrounds gut.
- Acoelomate has sac type digestive system, no respiratory and osmoregulatory systems. They have tubular excretory system called protonephridia having flame cells.
- Spiral and determinate type cleavage is present in proterostomes. Pinworm belongs to phylum Aschelminthes that are proterostomes.
- Molluscs are proterostomes and have determinate cleavage in which fate of blastomeres is foretold. Indeterminate cleavage is characteristic of deuterostomes.

PMC Topic-6

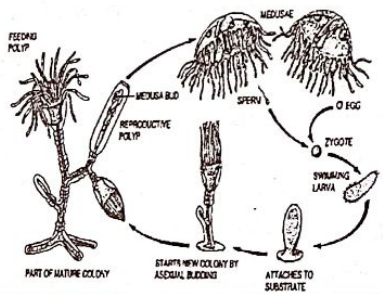
19.



20. Cnidarians are essentially sac-like made of two cell layers. The outer ectoderm, or epidermis, contains the cnidocytes, the stinging cells that are characteristic of the phylum. In between epidermis and gastrodermis (endodermis) is the mesoglea, a layer of jellylike substance which contains scattered cells and collagen fibers.
21. False coelom is characteristic of Aschelminthes (nematodes). Hook worm belongs to this phylum.
22. All the Platyhelminthes (flatworm) are acoelomates.
23. Amoebocytes are amoeba-like cells found in sponges. They are totipotent (able to divide and form differentiate cells) in nature. They basically store, digest and transport food, excrete wastes, secrete skeleton and also may give rise to buds in asexual reproduction.
24. Unlike Protozoans, the Porifera are multicellular. However, unlike higher metazoans, the cells that make up a sponge are not organized into tissues. Therefore, sponges lack true tissues and organs; in addition, they have no body symmetry.
25. A sponge endoskeleton consists of short, sharp rods called spicules. Spicules are made of silica, calcium carbonate, or spongin, a tough protein.



27. Sponges are aquatic animals, commonly found in bottom of water bodies. They have no exposure to air; therefore they cannot be used as air pollution indicators.
28. Due to simple organization the members of the genus Hydra reproduce by budding, fragmentation or regeneration.
- 29.



30.

Medusa is a mobile life cycle stage of the Cnidaria phylum, contracting with it muscular bell. Polyp has a tubular shape and are fixed at their base, with the mouth present at the other end of the tube facing the water.

31.

Sound travels as a wave that can either absorb into a surface or reflect off it. Coral reefs do not have this ability.

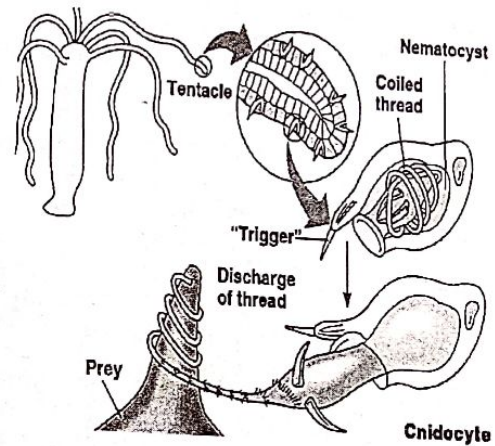
32.

General characteristics of Phylum coelenterate/cnidaria:
Kingdom: Animalia.
Habitat: aquatic, mostly marine.
Habit: solitary or colonial
Symmetry: radially symmetrical
Grade of organization: tissue grade of organization.
Germ layer: diploblastic, outer ectoderm and inner endoderm.

33.

- Functions of Gastrovascular cavity in coelenterates are;
- Digestion & distribution of nutrients throughout the body
 - Gases exchange
 - Remove of waste
 - Serve as a hydrostatic skeleton.

34.



35.

Phylum Platyhelminthes have bilateral symmetry. This means there is only one plane of symmetry.

36.

Intestinal parasites, generally do not absorb nutrients through the body surface as there is usually a thick cuticle to protect themselves from the host's digestive liquids.

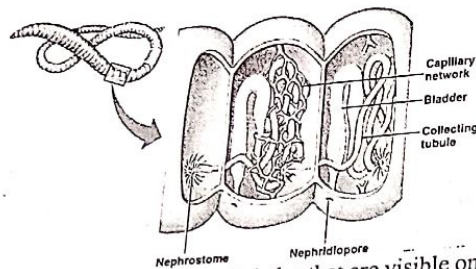
37.

Zoological name	Common name
<i>Fasciola hepatica</i>	Liver fluke
<i>Enterobius vermicularis</i>	Pin worm
<i>Taenia solium</i>	Tape worm
<i>Aurelia aurita</i>	Jelly fish

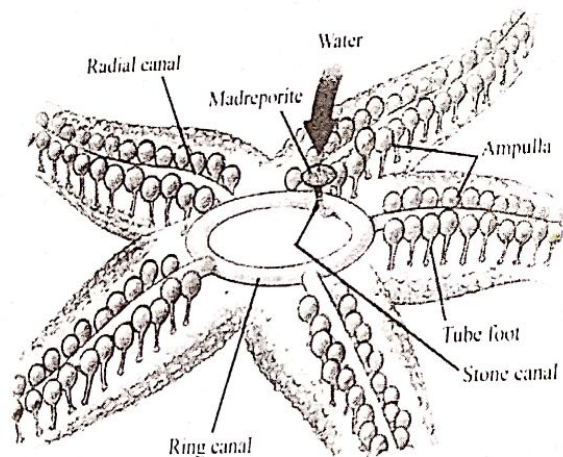
38.

The nematode nervous system consists of a set of neuronal processes that run lengthwise on the nematode body. These processes consist of neurons that have a cell body also known as a neurocyte. A group of neurocytes is called a ganglion. These ganglion connect to the nerve ring which surrounds the Pharynx.

39. In shelled molluscs, the mantle is the organ that forms the shell, and adds to the shell to increase its size and strength as the animal grows. Shell material is secreted by the ectodermic (epithelial) cells of the mantle tissue.
- 40.

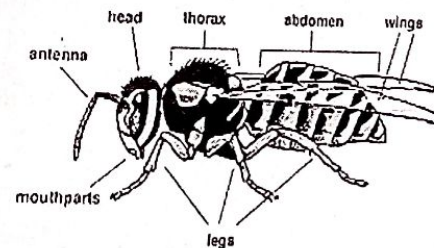


41. Locomotory setae are for crawling and are the bristles that are visible on the exterior of the earthworm. Slow creeping movements of *Neries* are carried out by the action of parapodia only.
42. More than 50% of total biodiversity of our planet is formed by the Arthropods.
43. Natural silk is fibrous protein produced by larvae of silk worm.
44. Scavengers are those animals that feed on dead animals and plants e.g. *Drosophila* and Vulture.
45. The echinoderms are exclusively marine.
46. Organs of locomotion in echinoderms are tube feet. These are present along the edges of grooves present in the arms.
- 47.



48. Arthropods are protostomes in which cleavage is determinate (fate of blastomeres is foretold). Each blastomere developed into its special structure.
49. Sheep is the primary host of liver fluke.
50. *Dugesia* are carnivores, and they eat other small invertebrates and dead or decaying animals.
51. Adult *Ascaris* worms inhabit the lumen of the small intestine, usually in the jejunum or ileus. They have a life span of 10 months to 2 years and then are passed in the stool.

52. Polymorphism refers to the occurrence of structurally and functionally more than two different types of individuals within the same organism. It is a characteristic feature of colonial organisms like those in *Hydrozoa*. The body of a Platyhelminthes (or tapeworm) consists of not only the ectoderm and the endoderm but also the mesoderm.
53. In arthropods, the body cavity is in the form of haemocoel.
54. *Fasciola hepatica*, also known as the common liver fluke lives in bile duct.
55. *Ascaris* worms inhabit the lumen of the small intestine, usually in the jejunum or ileus.
56. They have a life span of 10 months to 2 years and then are passed in the stool.
57. Polymorphism refers to the occurrence of structurally and functionally more than two different types of individuals within the same organisms. It is a characteristic feature of colonial organisms like *Obelia*.
58. In radial symmetry all body parts are arranged around the central axis. Radial symmetry represents sessile mode of life.
59. *Ascaris* belong to the phylum Nematoda of super phylum Aschelminthes. They have a complete digestive tract lined by endodermal epithelium.
60. *Taenia* is a genus of tapeworms (a type of Platyhelminthes) that includes some important parasites of livestock.
61. The major part of the tapeworm is called strobila and it consists of segments, proglottids.
62. They each contain both male and female reproductive organs.
63. *Ascaris* worms inhabit the lumen of the small intestine of human and pig.
64. Snails are the intermediate hosts of *Fasciola hepatica*.
65. *Ascaris lumbricoides* worms inhabit the lumen of the small intestine of human and pig.
66. Examples of acoelomates are found phylum Platyhelminthes, commonly known as flatworms. These invertebrate animals are unsegmented worms with bilateral symmetry.
67. Trochophore, also called trochosphere, small, translucent, free-swimming larva characteristic of marine annelids and most groups of mollusks.
68. **Platyhelminthes have the following important characteristics:**
- ✓ They are triploblastic, acoelomate, and bilaterally symmetrical.
 - ✓ They may be free-living or parasites.
 - ✓ The body has a soft covering with or without cilia.
 - ✓ Their body is dorsoventrally flattened without any segments and appears like a leaf.
69. *Pheretima* is a genus of earthworms found mostly in New Guinea and parts of Southeast Asia.



PMC Topic-6

70. Word Platyhelminthes (derived from the Greek platy, meaning "flat" while helminth, meaning "worm") are a phylum of relatively simple bilaterian, unsegmented, soft-bodied invertebrates.
71. The *Mesozoic Era* is an interval of geological time from about 252 to 66 million years ago. It is also called the *Age of Reptiles*.
72. Birds do not have teeth. Birds "chew" their food in their gizzard.
73. A *poikilotherm* is an animal whose internal temperature varies considerably. Spiny ant opposite of a *homeotherm*, an animal which maintains thermal homeostasis. Spiny ant eaters belong to homeotherm.
74. The lower jaw of mammals consists of only one bone, the dentary, and the jaw hinge connects the dentary to the squamosal (flat) part of the temporal bone in the skull. Working together, these muscles permit up-and-down and side-to-side movements of the jaw, making chewing possible which is unique to mammals.
75. Metatheria includes marsupials that possess a pouch and give birth to partially-developed young ones. Well-known marsupials include kangaroos, wallabies, koalas, opossums, wombats, Tasmanian devils, and the extinct Thylacine.
76. **Characteristics of Reptiles:**
 ✓ Reptiles are four-legged vertebrate animals.
 ✓ Most reptiles lay eggs.
 ✓ The skin of reptiles is covered with scales.
 ✓ Reptiles have cold-blooded metabolisms.
 ✓ Reptiles breathe with the aid of lungs.
77. Vertebral column is present only in vertebrates.
78. The central nervous system of all chordates is dorsal and hollow.
79. *Balanoglossus* and *Saccoglossus* belong to phylum hemichordata.

7
TOPIC

ENZYMES
PRACTICE EXERCISE

TOPIC-WISE MCQs
Introduction and Characteristics of Enzymes

- Q.1 If enzymes stop their functions, then biochemical reactions would:
 A. Stop
 B. Be slowed down
 C. Not affected
 D. Carried out at faster rate
- Q.2 All of the following are true for an enzyme except:
 A. Is globular protein
 B. Increase the energy of activation
 C. Remain unchanged after reaction
 D. Speed up the reaction
- Q.3 Enzymes catalyze all of the followings except:
 A. Digestion
 B. Cellular respiration
 C. Photosynthesis
 D. Breathing
- Q.4 The lower the activation energy, the _____ the reaction will be.
 A. Faster
 B. Moderate
 C. Slower
 D. Both A and B
- Q.5 Most of the enzymes are:
 A. Attached with organelles
 B. In cytoplasm
 C. Free floating
 D. In coagulated form
- Q.6 Enzymes related to fatty acids oxidation are present in/at:
 A. Plasma membrane
 B. Chloroplast
 C. Mitochondria
 D. Nucleolus
- Q.7 All enzymes are _____.
 A. Fibrous proteins
 B. Lipoproteins
 C. Low molecular weight proteins
 D. Globular proteins (MDCAT 2017)
- Q.8 The reactants on which enzyme work are:
 A. Products
 B. Substrates
 C. Metabolites
 D. Catabolites (MDCAT 2017)
- Q.9 What is true about enzymes?
 A. Fibrous proteins
 B. No effect on end product
 C. Use in reaction
 D. Non-specific (MDCAT 2017)
- Q.10 The main difference between catalysts and enzymes is:
 A. Enzymes are sharp in action than catalyst
 B. Catalysts used in large amount than enzymes
 C. Catalysts are inorganic while enzymes are organic in nature
 D. Enzymes need p11 while catalysts do not (ETEAT 2018)
- Q.11 The type of energy reduced by the enzymes for biological reactions to occur is called the:
 A. Light Energy
 B. Active Energy
 C. Activation Energy
 D. Heat Energy (MDCAT 2019)
- Q.12 Enzymes work by lowering the _____ of the reactions they catalyze.
 A. Kinetic energy
 B. Heat energy
 C. Activation energy
 D. Potential energy (PMC 2020)

PMC Topic- 7

Q.13 It is false about enzymes:

- A. All enzymes require co-factors for proper functioning
- B. Only small amount of enzymes is required
- C. They work in *in vitro* as well as in *in vivo* conditions
- D. They lower activation energy

Mechanism of Enzyme Action

Q.14 The reaction takes place in a small part of the enzyme called:

- A. Allosteric site
- B. Globular site
- C. Reactive site
- D. Active site

Q.15 Coenzymes are closely related to:

- A. Hormones
- B. Antibodies
- C. Inhibitors
- D. Vitamins

Q.16 The atoms, groups of atoms and molecules that join with enzymes altering their shape and making them functional:

- A. Substrate
- B. Prosthetic Group
- C. Coenzymes
- D. Co-factors

Q.17 If the co-factor is a non-protein like a metallic ion, it is referred to as a:

- A. Apoenzyme
- B. Coenzymes
- C. Activator
- D. Prosthetic group

Q.18 Non-protein part which is organic in nature and detachable is called:

- A. Activator
- B. Coenzyme
- C. Co-factor
- D. Prosthetic group

Q.19 Function of succinate dehydrogenase is aided by:

- A. NAD⁺
- B. Metal ion
- C. FAD⁺
- D. Vitamin

Q.20 Prosthetic groups are:

- A. Metallic ions
- B. Inorganic molecules
- C. Organic molecules
- D. Radicals

Q.21 All coenzymes are derived from:

- A. Proteins
- B. Metal ions
- C. Carbohydrates
- D. Vitamins

Q.22 A co-factor tightly bound to the enzyme on the permanent basis is called: (MDCAT 2014)

- A. Activator
- B. Prosthetic group
- C. Coenzyme
- D. Apo-enzyme

Q.23 An enzyme required Mg²⁺ to catalyze the substrate. The Mg²⁺ is best identified as: (MDCAT 2019)

- A. Prosthetic group
- B. Coenzyme
- C. Activator
- D. Inhibitor

Q.24 Which of the following comprises of inorganic ions? (MDCAT 2017)

- A. Coenzymes
- B. Prosthetic group
- C. Activators
- D. Apoenzyme

Q.25 A non-protein part essential for proper and essential functioning of enzyme is called: (MDCAT 2018)

- A. Extra factor
- B. Efficient co-factor
- C. Additional factor
- D. Co-factor

PMC Topic- 7

Q.26 An enzyme that is not protein in nature:

- A. Amylopsin
- B. Bam HI
- C. Arginase
- D. Peptidyl transferase

Mechanism of Action of Enzymes

Q.27 ES complex is converted into product by:

- A. Co-factor
- B. Coenzyme
- C. Catalytic site
- D. Binding site

Q.28 _____ suggested that each enzyme had a particular shape into which the substrate fit exactly.

- A. Koshland
- B. Coenzyme
- C. Emil Fischer
- D. Binding site

Q.29 Allosteric enzymes have _____ major sites.

- A. 1
- B. Robert Whittaker
- C. 2
- D. Michael Menten
- D. 4

Q.30 According to _____ model, the active site of enzyme is modified as the substrate interacts with enzyme. (MDCAT 2019)

- A. Induced fit
- B. Emil Fischer
- C. Lock and key
- D. Fluid mosaic

Q.31 Modified form of Lock and model was proposed by: (MDCAT 2017)

- A. Koshland
- B. Watson
- C. Fischer
- D. Rosalind Franklin

Q.32 According to Lock and Key model, the enzyme acts as:

- A. Lock
- B. Key
- C. Can act as both
- D. None

Q.33 Working of sucrase and maltase can be explained by:

- A. Induce fit model
- B. Lock and key
- C. Both models
- D. None

Q.34 With the increase of enzyme concentration in a reaction, more _____ is/are available for the substrate. (AJK 2019)

- A. Binding sites
- B. Products
- C. Active sites
- D. Activation energy

Q.35 Lock and key model for enzyme action proposed by Emil Fischer suggests that:

- A. Enzymes are unbiased for substrate
- B. Enzymes can modify their active sites
- C. Enzymes are restricted to one reaction type
- D. Enzyme can catalyze variety of reactions

Factors Affecting Rate of Enzyme Action

Q.36 The effect of reversible competitive inhibitor can be neutralized by increasing the concentration of:

- A. Substrate
- B. Activator
- C. Enzyme
- D. Inhibitor

Q.37 If the concentration of substrate molecule is higher than the enzymes then rate of reaction would be:

- A. Increasing
- B. Decreasing
- C. Remain constant
- D. Variable

Q.38 Optimum pH of enterokinase is:

- A. Slightly acidic
- B. Highly acidic
- C. Slightly basic
- D. Highly basic

PMC Topic- 7

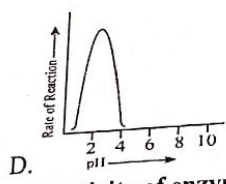
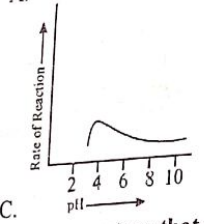
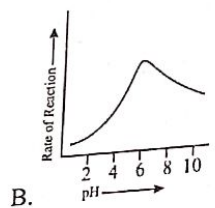
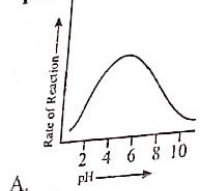
Q.39 Which of the following properties of amino acids is affected by a change in pH?
 A. Oxidation of amino acids
 B. Atomization of amino acids
 C. Reduction of amino acids
 D. Ionization of amino acids

Q.40 Change in temperature from 30°C to 40°C in human body will cause:
 A. Increase in rate of reaction
 B. Decrease in rate of reaction
 C. First increase then decreases in rate of reaction
 D. First increase then become constant

Q.41 Which of the following factor does not affect the rate of enzyme action?
 A. Enzymes concentration
 B. Substrate concentration
 C. Light intensity
 D. Temperature

Q.42 Which one of the following is the optimum pH of pancreatic lipase enzyme? (MDCAT 2014)
 A. 7.60
 B. 9.00
 C. 8.00
 D. 9.70

Q.43 Which one of the following graphs shows how the rate of reaction of pepsin is affected by pH? (MDCAT 2019)



Q.44 The temperature that promotes the maximum activity of enzyme is referred as: (MDCAT 2018)
 A. Fixed temperature
 B. Controlled temperature
 C. Optimum temperature
 D. Active temperature

Q.45 Which type of bonds is mostly affected in an enzyme molecule when there are pH fluctuations? (AJK 2019)
 A. Ionic bonds
 B. Disulphide bonds
 C. Hydrogen bonds
 D. Peptide bond

Q.46 Most enzymes have an optimum temperature of around: (PMC 2020)
 A. 30°C
 B. 50°C
 C. 40°C
 D. 20°C

Enzymes which require optimum temperature to be lower than 37° C for their proper functioning are present in:
 A. Liver
 B. Testes
 C. Kidney
 D. Stomach

PMC Topic- 7

Q.48 Which of the followings statement is correct?
 A. All enzymes in human body work at same temperature but different pH
 B. All enzymes in human body work at different temperature but same pH
 C. All enzymes in human body work at different temperature and same pH
 D. All enzymes in human body work at same temperature and same pH

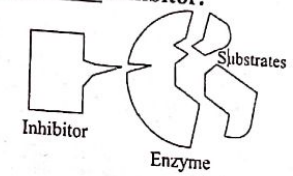
Q.49 Bond sensitive to change in temperature and pH are respectively:
 A. Hydrogen, Ionic
 B. Hydrogen, Covalent
 C. Ionic, Hydrogen
 D. Covalent, Ionic

Q.50 The temperature where inactive enzyme becomes active is called:
 A. Optimum temperature
 B. Minimum temperature
 C. Maximum temperature
 D. Activation temperature

Enzyme Inhibition

Q.51 The competitive inhibitors have structural similarity with: (MDCAT 2014)
 A. Active site
 B. Substrate
 C. Binding site
 D. Coenzyme

Q.52 This figure represents _____ inhibitor. (MDCAT 2019)



- A. Non-competitive
- B. Irreversible
- C. Competitive
- D. Isosteric

Q.53 Which of the following type of inhibitor can be neutralize by adding more substrate into reaction? (MDCAT 2017)
 A. Irreversible inhibitor
 B. Irreversible non-competitive
 C. Reversible inhibitor
 D. Irreversible competitive

Q.54 If molecule can bind to another site of the enzyme rather than the true active site, it is referred as _____. (MDCAT 2018)
 A. Non-competitive inhibitors
 B. Competitive inhibitors
 C. Allosteric inhibition
 D. Irreversible inhibition

Q.55 What is common in both competitive and non-competitive inhibition? (MDCAT 2019)
 A. Irreversible inhibition
 B. Reversible inhibition
 C. Feedback inhibition
 D. Non-Reversible inhibition

Q.56 A student of chemical engineering mistakenly engulfed the toxic compound "A" which was a potent inhibitor of certain enzyme. He was immediately brought to hospital where the doctor injected intravenously substrate "B" to minimize the toxic effect of compound A. His life was saved from serious damages. The treatment method shows that compound A was a _____ inhibitors. (MDCAT 2019)
 A. Temperature sensitive
 B. Irreversible
 C. Competitive reversible
 D. Non-competitive reversible

Q.57 Penicillin, an antibiotic inhibits bacterial growth. It is categorized as:
 A. Irreversible inhibitors
 B. Competitive inhibitors
 C. Non-competitive inhibitors
 D. Reversible inhibitors

PMC Topic- 7

- Q.58 Which of the followings is not an inhibitor of enzymes?
 A. Anti-metabolites
 B. Sucrose
 C. Antibiotics
 D. ATP
- Q.59 Heavy metal ions that act as inhibitors (mercury, silver and copper) break _____ in enzymes.
 A. Peptide bonds
 B. Disulphide bridges
 C. Hydrogen bonds
 D. Ionic bonds

(E TEA 2019)

Classification

- Q.60 Phosphatases belong to which group of the following?
 A. Lyases
 B. Ligase
 C. Hydrolases
 D. None of the above
- Q.61 Cytochrome oxidase are categorized in:
 A. Transferases
 B. Lyases
 C. Oxidoreductases
 D. Hydrolases
- Q.62 Conversion of glucose 6-phosphate into fructose 6-phosphate is done by:
 A. Transferases
 B. Isomerases
 C. Oxidoreductases
 D. Hydrolases

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

1	B	11	C	21	D	31	A	41	C	51	B	61	C
2	B	12	C	22	B	32	B	42	B	52	A	62	B
3	D	13	A	23	C	33	B	43	D	53	C		
4	A	14	D	24	C	34	A	44	C	54	A		
5	A	15	D	25	D	35	C	45	A	55	B		
6	C	16	D	26	D	36	A	46	C	56	C		
7	D	17	C	27	C	37	C	47	B	57	A		
8	B	18	B	28	C	38	A	48	A	58	B		
9	B	19	C	29	C	39	D	49	A	59	B		
10	C	20	C	30	A	40	C	50	B	60	C		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

- The biological processes that occur within all living organisms are chemical reactions, and enzymes regulate most. In the presence of enzymes, these chemical reactions carried out at faster rate, while in the absence they will slow down.
- Enzymes are the biological catalysts, which speed up rate of chemical reaction by lowering energy of activation.
- Breathing (or ventilation) is the process of moving air out and in the lungs to facilitate gas exchange with the internal environment, mostly to flush out carbon dioxide and bring in oxygen. There is no involvement of any enzyme to carry out breathing.
- Enzymes are the biological catalyst, which speed up rate of chemical reaction by lowering energy of activation.
- The membrane-bound organelles contain a variety of enzymes called hydrolases that can digest proteins, nucleic acids, lipids, and complex sugars. But many enzymes are present in cytoplasm of cell.
- Fatty acid metabolism is the function of mitochondria, while synthesis of lipids is the function of SER.
- Enzymes are composed of hundreds of amino acids joined together and coiled upon themselves to form a globular structure.
- A substrate is a molecule acted upon by an enzyme. When substrates bind to enzymes, they undergo an enzyme induced chemical change, and are converted to products.
- Enzymes are globular proteins, which act as biocatalyst and speed up biochemical reactions and their presence does not affect the nature of properties of end product/s.
-

Catalyst	Enzyme
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Catalysts are simple inorganic molecules. Enzymes are complex proteins.

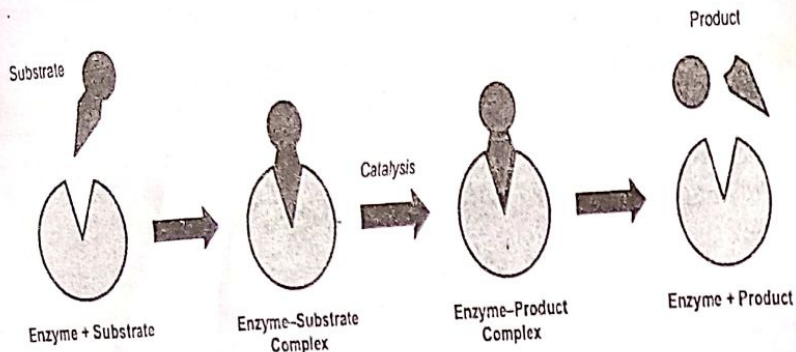
Inorganic catalyst. Organic catalyst or biocatalyst.

Reaction rates typically slower. Reaction rates several times faster.

- The minimum amount of energy requires to start a chemical reaction is called activation energy. Enzymes speed up reaction by lowering its activation energy.
- An enzyme binds to its specific substrate by its catalytic site and transforms its substrate into product. So this pathway lowers the activation energy.
- Co-factors are non-protein parts that are required for proper functioning of enzyme but some enzymes such as pepsin do not require co-factors.

PMC Topic- 7

14.



15. Many of the coenzymes are derived from the vitamins, e.g. NAD is a coenzyme and is derived from vitamins.
16. A co-factor is a non-protein chemical that assists with a biological chemical reaction. Co-factors may be metal ions, organic compounds, or other chemicals that have helpful properties not usually found in amino acids.

17.

Apoenzyme	An enzyme without its non-protein part.
Coenzyme	If non-protein part loosely attached to protein part of enzyme. It is organic in nature.
Activator	If non-protein part loosely attached to protein part of enzyme. It is inorganic in nature.
Prosthetic group	If non-protein part covalently attached to protein part of enzyme.

18.

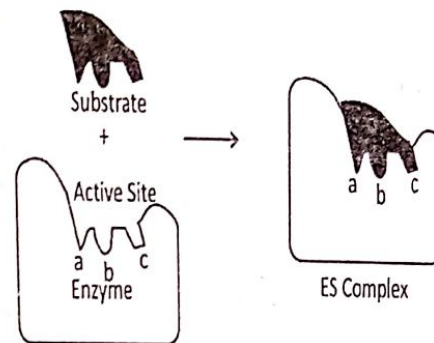
Co-factor	Non-protein chemical that assists with a biological chemical reaction. It may be organic or inorganic.
Coenzyme	If non-protein part loosely attached to protein part of enzyme. It is organic in nature.
Activator	If non-protein part loosely attached to protein part of enzyme. It is inorganic in nature.
Prosthetic group	If non-protein part covalently attached to protein part of enzyme.

19. During the conversion of the succinic acid into fumaric acid, FAD^+ is reduced by gaining two hydrogen atoms from succinic acid, which are liberated by succinate dehydrogenase.
20. Inorganic co-factors are activators while organic co-factors may be coenzymes or prosthetic group.
21. Coenzymes are closely related to vitamins, which represent the essential raw materials from which coenzymes are made. Only small quantities of vitamins are needed because, like enzymes, coenzyme can be used again and again
22. The detachable co-factor is known as an activator if it is an inorganic ion. If the non-protein part is covalently bonded, it is known as a prosthetic group. If it is loosely attached to the protein part, it is known as coenzyme. Enzyme with its co-factor is removed is called apoenzyme.

PMC Topic- 7

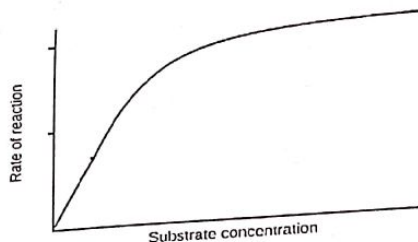
23. Some enzymes use metal ions as co-factors like Mg^{+2} , Fe^{+2} , Cu^{+2} , Zn^{+2} etc. The detachable co-factor is known as an activator if it is an inorganic ion.
24. Some enzymes use metal ions as co-factors like Mg^{2+} , Fe^{2+} , Cu^{2+} , and Zn^{2+} etc. The detachable co-factor is known as an activator if it is an inorganic ion while coenzyme, apoenzyme and prosthetic group are organic in nature.
25. Some enzymes consist solely of proteins. Others also have a non-protein part known as a co-factor, which is essential for the proper functioning of the enzymes. The co-factor usually acts as 'bridge' between the enzyme and its substrate.
26. Peptidyl transferase connects two amino acids by formation of peptide bond during translation process. It is a catalytic RNA.
27. Active site contains two sites binding site and catalytic site. Binding site is responsible for the formation of ES complex. After the formation of this complex catalytic site is activated and it converts ES complex into products.

28.



29. Along the active site for the attachment of substrate, allosteric enzymes also have another site where a molecule that is not a substrate may bind and regulate the enzyme action.
30. According to induce fit model, when a substrate combines with an enzyme, it induces changes in the enzyme structure. The change in structure enables the enzyme to perform its catalytic activity more efficiently.
31. Modified form of lock and key model is called induced fit model, which was proposed by D. Koshland. According to this model, when a substrate combines with an enzyme, it induces changes in the enzyme structure.
32. According to lock and key model, the enzyme acts as the "key" while the substrate is the "lock".
33. The working of non-regulatory enzymes such as sucrase and maltase is best explained by Lock and key model, due to their specificity of substrate and reaction.
34. When enzyme molecules increase there will be more active sites available for the binding of more substrates, due to which reaction rate will further increase.
35. According to lock and key model, every enzyme is specific due to its active site for its substrate. Therefore, every enzyme can convert only its specific substrate into product.
36. Addition of more substrate molecules will replace inhibitors, and will bind with the active site of the enzyme and results in increase in rate of reaction.

37.



38. Optimum pH of enterokinase is 5.50, which is slightly acidic.
39. Change in pH causes the imbalance of H^+/OH^- ions, which causes the ionization of amino acids at the active sites and substrate as well.
40. The optimum temperature for the enzymes in human body is $37^\circ C$. When the temperature is increased from $30^\circ C$, the rate of reaction is also increased. At $37^\circ C$, the rate of reaction is maximum. If the temperature further increases, the rate of reaction decreases due to denaturation of enzymes at high temperature.
41. Rate of reaction effects by substrate concentration, temperature, pH and enzyme concentration.
42. Optimum pH values for the catalytic activity of catalase, chymotrypsin, pancreatic lipase and Arginase are 7.60, 7.00-8.00, 9.00 and 9.70, respectively.
43. Every enzyme work best at its optimum pH. Pepsin optimum pH is 2. In the pH above 2 pepsin will be denatured.
44. All enzymes can work at their maximum rate at a specific temperature called as optimum temperature. For enzymes of human body, $37^\circ C$ is the optimum temperature.
45. Hydrogen bond will have affected due to increase in temperature than optimum value, while change in pH will affects ionic bond.
46. Optimum temperate of human body is around $37^\circ C$ so, most of the enzymes work around this temperature with their maximum efficiency.
47. All body parts have optimum temperature around $37^\circ C$ but spermatogenesis takes place at $35^\circ C$.
48. All enzymes in human body work at optimum temperature of $37^\circ C$ with exception of testes. The pH for all enzymes is different such as pepsin works best at pH 2 while salivary amylase works best at pH 6.80.
49. Enzymes are protein in nature and different types of bonds (Hydrogen and Ionic) maintain their structure. Rise in temperature from optimum breaks hydrogen bonds while change in pH disturbs ionic bonds.
50. The least amount of temperature that is required to activate a temperature-inactivated enzyme is called as minimum temperature.
51. Non-competitive reversible inhibitors block allosteric site of enzyme while competitive reversible inhibitors have structural similarity with substrate and they bind active site of enzyme.
52. Non-competitive inhibitor binds allosteric site of enzyme rather than active site.
53. Reversible inhibitors can form weak linkages with the enzyme. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate.
54. Non-competitive reversible inhibitor blocks allosteric site of enzyme while competitive inhibitor has structural similarity with substrate and they bind active site of enzyme.

55. Both competitive and non-competitive inhibitors are types of reversible inhibitor and their effect can be neutralizing by adding small amount of substrate.
56. Reversible inhibitors form weak linkages with the enzyme. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate. Since the student was recovered after injected substance 'B', it means that substance 'B' is the original substrate of that enzyme which has been competitively blocked by substance 'A'.
57. Pencillin inhibits formation of cell wall and bacteria are unable to undo effect of pencillin so it is categorized as irreversible inhibitor.
58. Sucrose is a carbohydrate. It is a substrate for enzyme but it does not act as inhibitor for any enzyme. ATP is non-competitive inhibitor for phosphofructokinase.
59. Heavy metals bind to the thiol (-SH) group of amino acids and break the disulphide bridges between the amino acids.
60. Lyases and ligases are enzymes involved in catalyzing biochemical reactions. The main difference between lyases and ligases is that lyases break chemical bonds in order to form new compounds whereas ligases form chemical bonds in order to combine different compounds.
61. Oxidoreductases catalyze oxidation/reduction of their substrate and act by removing or adding electron or H^+ ions from or to substrate. Cytochrome oxidase oxidizes cytochromes.
62. Formation of fructose 6-phosphate from glucose 6-phosphate is a glycolytic pathway reaction and is catalyzed by phosphoglucose isomerase. Glucose and fructose are isomers to each other so an enzyme that catalyzes this reaction is classified as Isomerase.

Concepts of Evolution

- Series of changes in the genetic composition of a population over time is called:
- Q.1 A. Revolution B. Population genetics
C. Evolution D. Succession
- Q.2 Product of evolution is:
A. Ecosystem B. Community
C. Biome D. Species
- Q.3 Who developed a theory of natural selection essentially identical to Darwin's?
A. Hardy-Weinberg B. Malthus
C. Alfred Wallace D. Lyell
- Q.4 All of the following are related to evolution except:
A. Change over time B. Muscle hypertrophy
C. Antibiotic resistance in bacteria D. Origin of new species
- Q.5 Which one of the following statements is correct?
A. There is no evidence of the existence of gills during embryogenesis of mammals
B. All plant and animal cells are totipotent
C. Ontogeny repeats phylogeny
D. Stem cells are specialized cells
- Q.6 He was not vocal for the idea of evolution:
A. Aristotle B. Lamarck
C. Linnaeus D. Darwin
- Q.7 It is not true about evolution:
A. It is a slow and continuous process
B. Evolution doesn't leave observable signs
C. Evolution transforms life on earth
D. Evolutionary relationships among organisms are reflected in their DNA

Evolution of Eukaryotes from Prokaryotes

- Q.8 This theory says that mitochondria and chloroplasts are in fact ancient bacteria which now live inside the larger cells. (PMC 2020)
A. Darwin's theory of evolution B. Neo Darwinism
C. Lamarckism D. Endosymbiont theory
- Q.9 Life started about:
A. 1.5 billion years ago B. 2.5 billion years ago
C. 3.5 billion years ago D. 4 billion years ago

Lamarckism

- Q.10 Adaptations that an organism acquires by its own actions are:
A. Heritable
B. Not heritable
C. Can be made heritable through some modifications
D. Both heritable and not heritable

- Q.11 Lamarck presented a mechanism to explain:
A. How earth formed B. How specific adaptations evolved
C. How life started D. How life changed
- Q.12 Which one is according to Lamarckism is true?
A. Variation → adaptations → inheritance B. Recombination → variation → adaptations
C. Adaptations → variation → inheritance D. Mutations → variations → adaptations
- Q.13 Which statement is contradictory to Lamarckism?
A. Acquired characteristics can be passed to offspring
B. Extensive usage causes hypertrophy
C. Disuse causes atrophy
D. Acquired characteristics can't be inherited
- Q.14 Which of the following is not an example of disuse of organs?
A. Snake's feet B. Shedding of teeth
C. Muscle atrophy D. Movement of ear
- Q.15 Which is not related to the idea of use and disuse:
A. Extensively used body parts become longer and strong
B. Disused body parts deteriorated
C. Bigger bicep of black smith
D. Different type of beaks present in finches
- Q.16 First ever theory which explained evolution as a process is:
A. Darwinism B. Haeckelism
C. Wallaceism D. Lamarckism

Darwinism

- Q.17 Unique fauna was observed by Darwin in:
A. Ecuador B. Bahamas
C. Galapagos D. Maldives
- Q.18 Darwin perceived origin of new species and _____.
A. Fixation B. Stabilization
C. Adaptation D. Maladaptation
- Q.19 What is the perception of Darwin about unity of life?
A. All organisms descent from a common ancestor
B. All organisms are created specially by a divine force
C. All organisms share a common biological composition
D. All organisms arise from nonliving things
- Q.20 Over production of individuals leads to the _____ amongst the members of a population.
A. Harmony B. Variations
C. Competition D. All A, B, C
- Q.21 According to Darwin _____ become better adapted to local environment through natural selection.
A. Regional community B. Ecosystem
C. Population D. Flora
- Q.22 Survival is only for the fittest is true for:
A. Artificial selection B. Descent with modification
C. Natural selection D. Revolution

PMC Topic-8

- Q.23 Survival in the struggle for existence depends upon:**
 A. Physical environment
 B. Hereditary constitution
 C. Chemical constituents
 D. Environmental resources
- Q.24 How many types of finches were observed by Darwin at Galapagos Island?**
 A. 12
 B. 14
 C. 11
 D. 10
- Q.25 Which one is related to natural selection?**
 A. More people → more resources → no competition
 B. More people → less resources → more competition
 C. Less people → more resources → no competition
 D. Less people → less resources → no competition
- Q.26 Darwin's theory of evolution was mainly based on the evidences from _____.**
 A. Geographical distribution and fossil record
 B. Fossil record and Embryology
 C. Geographical distribution and comparative anatomy
 D. Paleontology and Geology
- Q.27 Over many years two population could become dissimilar enough to be designated as separate species that is applied upon:**
 A. Galapagos finches
 B. Giant turtle
 C. Black smith bicep
 D. Giraffe neck
- Q.28 Which is not a geographical barrier?**
 A. Ocean
 B. Low land
 C. Mountains
 D. Atmosphere
- Q.29 According to the theory of natural selection, organisms produce:**
 (MDCAT 2017)
 A. More offspring than supported
 B. Less offspring than supported
 C. Offspring according to the resources available
 D. Offspring to create resources
- Q.30 Which animals support Darwin's view of inheritance of desirable variation?**
 (NTS 2019)
 A. Giraffe
 B. Galapagos finches
 C. Snake
 D. All of these
- Q.31 _____ occurs because natural selection gives some alleles a better chance of survival than others.**
 (PMC 2020)
 A. Fitness
 B. Crossing over
 C. Evolution
 D. Artificial selection
- Neo-Darwinism**
- Q.32 Neo-Darwinism has integrated discoveries and ideas from all except:**
 A. Taxonomy
 B. Genetics
 C. Paleontology
 D. Serology
- Q.33 Neo-Darwinism is:**
 A. Darwinism + Lamarckism
 B. Darwinism + Mendelism
 C. Darwinism + Haeckelism
 D. Lamarckism + Mendelism

- Q.34 The finches of Galapagos Islands provide evidence in favour of:**
 A. Evolution due to mutation
 B. Evolution due to biogeography
 C. Retrogressive evolution
 D. Special creation
- Q.35 Modern biological sciences suggest that _____ are the ancestors of all life forms.**
 A. Protists
 B. Prokaryotes
 C. Protozoans
 D. Parazoans
- Q.36 _____ provides a visual records in a complex series showing the evolution of an organism.**
 A. Comparative anatomy
 B. Comparative embryology
 C. Fossils record
 D. Electron microscopy
- Q.37 The presence of gill slits, in the embryos of all vertebrates, supports the theory of:**
 A. Metamorphosis
 B. Recapitulation
 C. Organic evolution
 D. Biogenesis
- Q.38 Which is not a character of fossils?**
 A. Actual remains of ancient organisms
 B. Living
 C. Traces of ancient organisms
 D. May be embedded in sand, resin or ice
- Q.39 Functionally different but structurally alike organs are:**
 A. Analogous
 B. Homologous
 C. Anomalous
 D. Cosmopolitan
- Q.40 Analogous organs help organism to live in:**
 A. Same habitat
 B. Different biomes
 C. Different habitats
 D. Environment
- Q.41 Which one of the following statement could not be used to describe a species:**
 A. A group with similar autosomes
 B. A group with analogous structures
 C. A group capable of producing viable off springs
 D. A group sharing same niche
- Q.42 When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed?**
 A. Microevolution
 B. Convergent evolution
 C. Co-evolution
 D. Divergent evolution
- Q.43 The actual remains or traces of organisms that lived in ancient geological times:**
 A. Vestigial remains
 B. Fuel
 C. Fossils
 D. Analogous organs
- Q.44 In humans gill pouches have modified into:**
 A. Nose
 B. Eustachian tubes
 C. Ear
 D. External ear
- Q.45 Vestiges of vestigial organs are those organs which have ceased to be of any use in their possessor but they persist to reduce from generation after generation. In man they are:**
 (KMDC 2014)
 A. Vermiform appendix
 B. Coccyx
 C. Nictitating
 D. Ear muscles
 E. All of these
- Q.46 The organs which are similar in function but different in structure, are called:**
 (PMC 2020)
 A. Analogous organs
 B. Convergent evolution
 C. Homologous organs
 D. Divergent evolution

- Q.47 Forelimbs of man, horses and whales show:
 A. Analogous organs
 B. Divergent evolution
 C. Chemical evolution
 D. Convergent evolution
- Q.48 "Evolution is a remodeling process", this is supported by:
 A. Biogeography
 B. Comparative physiology
 C. Comparative anatomy
 D. Molecular biology
- Q.49 The comparative embryology of all vertebrates shows presence of:
 A. Hairs
 B. Gill pouches
 C. Scales
 D. Fins
- Q.50 Fossils are most likely to be present in:
 A. Sedimentary rocks
 B. Metamorphic rocks
 C. Igneous rocks
 D. Shower curtains

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

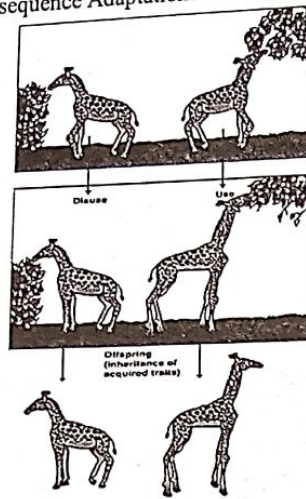
1	C	11	B	21	C	31	C	41	B
2	D	12	C	22	C	32	D	42	B
3	C	13	D	23	B	33	B	43	C
4	B	14	B	24	B	34	B	44	B
5	C	15	D	25	B	35	B	45	E
6	C	16	D	26	A	36	C	46	A
7	B	17	C	27	A	37	B	47	B
8	D	18	C	28	D	38	B	48	C
9	C	19	A	29	A	39	B	49	B
10	B	20	C	30	B	40	A	50	A

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Evolution is heritable change in characteristics of biological populations over successive generations. Evolutionary processes give rise to biodiversity at every level of biological organization.
2. Final product of evolution is always a new species and it is smallest unit of classification.
3. The research of British naturalist Alfred Russell Wallace (1823-1913) played a pivotal role in developing the theory of natural selection as it had the same theme to that of Darwin. But he attributes his work to Charles Darwin.
4. Muscle hypertrophy involves an increase in size of skeletal muscle through an increase in size of its component cells, i.e. increased storage of glycogen etc.
5. Haeckel (1810) proposed that developing animal embryo passes through stages resembling adult forms of its ancestors. E. Haeckel (1868, 1874) formulated biogenetic law or recapitulation theory which states that ontogeny (developmental history of an individual) repeats phylogeny (development history of races), all other are incorrect.
6. Carlos Linnaeus introduced binomial nomenclature. He assigned scientific names to living organisms but he was not vocal for idea of evolution.
7. Evolution is a long term process and it takes place by changes in the existing organisms so it leaves observable signs.
8. According to the endosymbiotic theory, mitochondria of eukaryotes derive from eubacteria. The host may be more closely related to the Archeae. Following endosymbiosis gave rise to the chloroplasts of algae and plants.
9. Biologists believe that life began about 3.5 billion years ago.
10. Darwin's theory has been supported by a lot of evidence. Lamarck's Theory of Inheritance of Acquired Characteristics has been disproved. This was done in two major ways. The first is by experiment. We have seen through many real examples and observations that changes which occur in an animal during life are not passed on to the animal's offspring. If a dog's ears are cropped short, its puppies are still born with long ears. If someone exercises every day, runs marathons, eats well, and is generally very healthy, the fitness is not passed on and the person's children still have to work just as hard to get that fit and healthy, because only germ cell mutation are inherited.
11. Lamarckism is the hypothesis that an organism can pass on characteristics that it has acquired during its lifetime to its offspring as well as how specific adaptations evolve.

12. As we can observe the sequence Adaptations → Variations → Inheritance.



13. The inheritance of *acquired characteristics* is a hypothesis that physiological changes *acquired* over the life of an organism may be transmitted to offspring and option D is contradictory to hypothesis.
14. Shedding of deciduous teeth is a term given to describe the physiological process that ultimately leads to replacement of the deciduous teeth by their corresponding permanent teeth and it is not an example of disuse of organs.
15. Darwin's finches are a classical example of an adaptive radiation. Their common ancestor arrived on the Galapagos about two million years ago. During the time that has passed Darwin's finches have evolved into 14 recognized species differing in body size, beak shape, song and feeding behavior.
16. Lamarck was a great scientist of his time. He understood process of evolution and presented a theory to explain how evolution takes place. He could not present visual evidences to support his theory.
17. Darwin visited the Galapagos Islands and observed unique fauna of this land.
18. After returning to Britain, Darwin perceived the origin of new species and adaptations as closely related processes for evolution.
19. The phrase descent with modification summarized Darwin's perception of the unity of life. The phrase refers to the view that all organisms are related through descent from an ancestor that lived in the remote past. In the Darwinian view, the history of life is like a tree with branches representing life's diversity.
20. When number of individuals are more than available resources, a competition would start between members for the resources.
21. Natural selection is the differential survival and reproduction of individuals (population) due to differences in phenotype. It is a key mechanism of evolution, the change in the heritable traits characteristic of a population over generations.
22. During artificial selection only fittest organisms are selected, while during natural selection survival restricts for the fittest organisms as they have such inherited characteristics which make them fit for their environment and leave more offspring than the less fit individuals.

23. Survival in struggle for existence depends upon hereditary constitutions and good variations.
24. From Galapagos Islands, Darwin collected 14 types of finches because these were although quite similar, seemed to be different species.
25. Logically when there are more people and fewer resources, there shall be high competition for struggle of existence and people with better inherited characteristics will be selected naturally.
26. Darwin's theory of evolution was mainly based on the evidences from biogeography and fossil record as he observed and collected these evidences from expedition.
27. Allopatric speciation is speciation that happens when two populations of the same species become isolated from each other due to geographic changes. Speciation is a gradual process by which populations evolve into different species and Galapagos finches are example of allopatric speciation.
28. A geographical barrier is something that blocks the pathway to something, this can be any natural feature such as mountains that prevents easy movement from one place to another and atmosphere is not a geographical barrier.
29. According to theory of natural selection, those organisms whose inherited characteristics fit them best to their environment are likely to leave more offsprings than the less fit individuals.
30. Galapagos is an island where Darwin observed almost 13 types of finches with distinct traits.
31. Evolution occurs because natural selection gives some alleles a better chance of survival than others.
32. The theory of evolution as expounded by later students of Charles Darwin, especially Weismann, holding that natural selection accounts for evolution and denying the inheritance of acquired characters and includes most of the advance sciences like Taxonomy, Palaeontology and Genetics but not serology (study of blood).
33. At time of birth of Darwinism knowledge of genetics had not surfaced. When Mendelism got attention, it became clear that process of Darwinism cannot be explained without population genetics so theory of modern synthesis (Neo-Darwinism) was introduced.
34. Biogeographical evolution is a process in which gene pool of a population gradually changes in response to environmental pressures, natural selection and genetic mutations.
35. The oldest known fossil belongs to prokaryotes which suggest that they are the ancestors of all life forms.
36. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age. The totality of fossils is known as the fossil record.
37. The theory of recapitulation, also called the biogenetic law or embryological parallelism—often expressed using Ernst Haeckel's phrase "ontogeny recapitulates phylogeny"—is a historical hypothesis that the development of the embryo of an animal, from fertilization to gestation or hatching (ontogeny), goes through similar stages and presence of gill slits in all vertebrate embryos is one of the best example of this theory.
38. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age.
39. Organs such as bat's wing, wings of birds, seal's flipper, forelimb of a horse, and human arm have a common underlying anatomy that was present in their last common ancestors; therefore, their forelimbs are homologous organs.
40. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately but survive in same kind of habitat performing similar function.

41. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately but survive in same kind of habitat performing similar function and are not used to define species.
42. Convergent evolution is the process whereby organisms not closely related in origin, independently evolve similar traits as a result of having to adapt to similar environment or ecological niches. On a molecular level, this can happen due to random mutation unrelated to an adaptive change.
43. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age. Examples include bones, shells, exoskeletons, stone imprints of animals or microbes, hair, petrified wood, oil, coal, and other remnants.
44. Ancestral characters are often, but not always, preserved in an organism's development. For example, both chick and human embryos go through a stage where they have slits and arches in their necks like the gill slits and gill arches of fish but in humans one of these gill pouches develop into Eustachian tubes.
45. All of the above are vestigial structures of man.
46. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately after diverging from an ancestor without wings.
47. Forelimbs of mammals are homologous organs (Same structure and different functions) and these organs show divergent evolution.
48. Comparison of anatomical structures of organisms of same species of different eras show marked differences. Older organisms were simple and present day organisms are more advanced. This remodeling takes place due to evolution.
49. All vertebrates have structures common in their embryonic stages; gill pouches is one of them. In fish gill pouches are converted in to gills and in land vertebrates pouches are converted are into Eustachian tube.
50. It has been observed while conducting studies of paleontology that fossils are recovered from sedimentary rocks mostly.

9
TOPIC **LIFE PROCESSES IN ANIMALS & PLANTS**
(NUTRITION/GASEOUS EXCHANGE/TRANSPORT)
PRACTICE EXERCISE

TOPIC-WISE MCQs

NUTRITION

Carnivorous Plants

- Q.1 All the insectivorous plants are:
A. Heterotrophic
C. Decomposers
B. Autotrophic
D. Parasites
- Q.2 End of leaf is modified to form a hood in:
A. *Sarracenia purpurea*
C. *Dionaea muscipula*
B. *Drosera intermedia*
D. All of A, B, C
- Q.3 Pick out the different:
A. Dodder
C. Venous fly trap
B. Sundew
D. Pitcher plant

Digestive System

- Q.4 In which of the following types of animals would you expect the digestive tract to be more complex:
A. Those with single opening
C. Those with two opening
B. Those with multiple openings
D. Those without any opening
- Q.5 How many sites of digestion are present in the digestive system of man?
A. 3
C. 5
B. 4
D. 6

Digestion in Oral Cavity

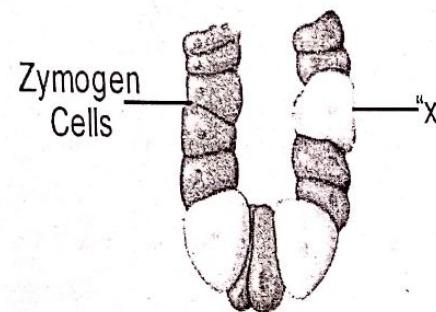
- Q.6 Cooking of the food and _____ in the mouth significantly improve the digestibility of food stuff by the enzymes.
A. Mastication
C. Churning
B. Peristalsis
D. Acidity
- Q.7 The digestion of carbohydrates occurs briefly in _____ and largely in the _____ respectively.
A. Mouth, intestine
C. Esophagus, mouth
B. Stomach, intestine
D. Mouth, stomach
- Q.8 On taking a spoonful of boiled rice and after partial digestion, which of the following biomolecule cannot be the part of bolus?
A. Protein
C. Amylose
B. Vitamins
D. Monosaccharide
- Q.9 Oral cavity is aided in selection of food by all of the following senses except:
A. Smell
C. Sound
B. Sight
D. Taste
- Q.10 Align the following events performed by oral cavity:
1) Digestion
2) Mastication
3) Lubrication
4) Selection
A. 1,3,4,2
C. 4,3,2,1
B. 4,2,1,3
D. 4,2,3,1

PMC Topic-9

- Q.11 Main function of NaHCO_3 and other salts in buccal cavity is to:
 A. Perform chemical digestion
 B. Stabilize the pH
 C. Act as antiseptic agent
 D. Act as promoter of Ptyalin
- Q.12 All of the following are influenced by the movement of tongue except:
 A. Nasal opening
 B. Teeth cleansing
 C. Epiglottis
 D. Peristalsis
- Q.13 Peristalsis is the characteristic movement of _____.
 A. Respiratory tract
 B. Reproductive tract
 C. Digestive tract
 D. Urinary tract
- Q.14 Which of the following region in alimentary canal produces no enzyme?
 A. Oesophagus
 B. Duodenum
 C. Stomach
 D. Jejunum
- Q.15 Digestion of _____ starts in oral cavity due to the action of enzyme present in saliva. (MDCAT 2016)
 A. Starch
 B. Fatty Acids
 C. Cellulose
 D. Polypeptides
- Q.16 Food is diverted in the oesophagus by:
 A. Glottis
 B. Cheeks
 C. Tongue
 D. Epiglottis
- Q.17 Salivary amylase begins to digest starch to shorter polysaccharides and then to: (MDCAT 2017)
 A. Sucrose
 B. Maltose
 C. Glucose
 D. Lactose
- Q.18 Type of salivary glands found in human oral cavity: (MDCAT 2017)
 A. 3
 B. 6
 C. 4
 D. 2
- Digestion in Stomach**
- Q.19 Cardiac sphincter is present at the junction of stomach and:
 A. Esophagus
 B. Duodenum
 C. Caecum
 D. Heart
- Q.20 Which one is different from others?
 A. Amylase
 B. Glucagon
 C. Gastrin
 D. Insulin
- Q.21 More gastric juice is produced by gastric glands on the stimulation of a hormone:
 A. Pepsinogen
 B. Secretin
 C. Gastrin
 D. Insulin
- Q.22 The digestive enzyme which is absent in adults:
 A. Rennin
 B. Renin
 C. Amylase
 D. Enterokinase
- Q.23 Which of the following layer regulates the peristaltic movement along the digestive tract?
 A. Middle
 B. Innermost
 C. Outermost
 D. Connective tissue layer
- Q.24 Pepsin hydrolyzes protein to yield:
 A. Acylglycerols
 B. Amino acids
 C. Peptones and polypeptide
 D. Dipeptides

PMC Topic-9

- Q.25 Which combination of the following food components in humans reaches the stomach undigested?
 A. Starch, Proteins and Fats
 B. Vitamins, Carbohydrates and Polypeptides
 C. Proteins, Cellulose and Fats
 D. Proteins, Starch and Cellulose
- Q.26 Gastric glands are composed of _____ types of cells. (MDCAT 2014)
 A. Two
 B. Four
 C. Three
 D. Five
- Q.27 HCl in gastric juice is secreted by which one of the following cells?
 (MDCAT 2014, 2015, 2016 2017)
 A. Chief cells
 B. Mucous cells
 C. Oxyntic cells
 D. Kupffer cells
- Q.28 Protein components of food are digested by the enzymatic secretion of:
 (MDCAT 2016)
 A. Goblet Cells
 B. Zymogen Cells
 C. Parietal Cells
 D. Oxyntic Cells
- Q.29 Digestive system consists of different layers, the innermost is known as:
 (MDCAT 2016)
 A. Submucosa
 B. Muscularis
 C. Mucosa
 D. Serosa
- Q.30 Food enters from stomach into small intestine through:
 (MDCAT 2016)
 A. Pyloric Sphincter
 B. Semilunar valve
 C. Cardiac Sphincter
 D. Diaphragm
- Q.31 Label 'a' in the following diagram:
 A. Cardiac sphincter
 B. Stomach valve
 C. Sino atrial valve
 D. Pyloric sphincter
- Q.32 Enzyme pepsin acts on:
 (MDCAT 2017)
- | Option | Substrate | Product |
|--------|-------------|------------------------|
| A. | Proteins | Polypeptides |
| C. | Polypeptide | Dipeptides |
| B. | Fats | Fatty acids / glycerol |
| D. | Proteins | Amino acids |
- Q.33 Following is the structure of gastric glands in stomach wall where 'x' is:
 (MDCAT 2017)



- A. Mucosa
 B. Visceral fat cells
 C. Mucus cells
 D. Oxyntic cells

PMC Topic-9

Digestion in Small Intestine

- Q.34 In the wall of alimentary canal, sequence from outer to inner is:
 A. Serosa, longitudinal muscle, mucosa, sub-mucosa
 B. Mucosa, serosa, muscles, epithelium
 C. Serosa, longitudinal muscles, circular muscles, sub-mucosa, mucosa
 D. Serosa, longitudinal muscles, sub-mucosa, mucosa
- Q.35 Lactase breaks the lactose into:
 A. Fatty acids + glycerols
 B. Amino acid + peptones
 C. Glucose monomers
 D. Glucose + galactose
- Q.36 Final digestion of food stuff and absorption of digested products occur at:
 A. Small intestine
 B. Large intestine
 C. Mouth
 D. Stomach
- Q.37 The hepatic portal vein is located between the:
 A. Hepatic vein – vena cava
 B. Mouth – stomach
 C. Pancreas – small intestine
 D. Small intestine – liver
- Q.38 Which of the following carries lipoproteins from digestive tract?
 A. Hepatic portal vein
 B. Mesenteric vein
 C. Lymphatic vessels
 D. Hepatic vein
- Q.39 Which of the following is produced from both intestinal lining and pancreas?
 A. Maltase
 B. Lipase
 C. Enterokinase
 D. Erypsin
- Q.40 Fats changes to lipoproteins in:
 A. Goblet cells
 B. Blood vessel
 C. Lacteals
 D. Crypts
- Q.41 These are the part of lymphatic system:
 A. Lacteals
 B. Duodenum
 C. Villi
 D. Liver
- Q.42 Which of the following do not pass from the small intestine to the large intestine?
 A. Water and sloughed off mucosal cells
 B. Cellulose and inactive enzymes
 C. Organic and inorganic salts
 D. Gastrin and secretin
- Q.43 Small intestine is termed small because of its small:
 A. Surface area
 B. Volume
 C. Diameter
 D. Length
- Q.44 Which of the following is not a component of intestinal juice?
 A. Ptyalin
 B. Lipase
 C. Erypsin
 D. Lactase
- Q.45 Fats pass into blood via:
 A. Right lymphatic duct
 B. Subclavian vein
 C. Thoracic lymphatic duct
 D. Jugular vein
- Q.46 Starch is digested in:
 A. Oral cavity and stomach
 B. Buccal cavity and duodenum
 C. Duodenum and ileum
 D. Esophagus and proximal part of small intestine only
- Q.47 Which of the following is incorrect regarding to trypsin and pepsin?
 A. Both released as pro-enzymes
 B. Both are endo-peptidase
 C. Both act upon same substrate
 D. Both act at same site and pH

PMC Topic-9

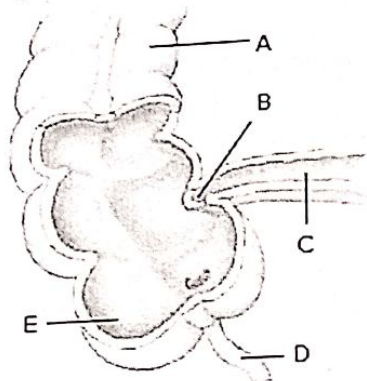
- Q.48 Which one of the following is endocrine pair present in digestive canal?
 A. Esophagus and Stomach
 B. Pancreas and Ileum
 C. Stomach and Duodenum
 D. Stomach and Liver
- Q.49 The hormone which increases the secretion of pancreatic juice is: (MDCAT 2015)
 A. Secretin
 B. Thyroxine
 C. Gastrin
 D. Parathormone
- Q.50 Trypsinogen is activated to trypsin by: (MDCAT 2015)
 A. HCl
 B. Mucus
 C. Enterokinase
 D. Gastrin
- Q.51 All kinds of absorption take place in: (MDCAT 2017)
 A. Duodenum
 B. Ileum
 C. Jejunum
 D. Colon
- Role of Liver and Pancreas in Digestion**
- Q.52 Secretion which lacks enzymes is:
 A. Saliva
 B. Pancreatic juice
 C. Bile
 D. Gastric juice
- Q.53 Release of NaHCO_3 and many enzymes required for intestinal digestion is related with:
 A. Pancreas
 B. Mouth
 C. Gallbladder
 D. Liver
- Q.54 The acidic dietary contents of the stomach, on reaching small intestine are neutralized by _____ produced by _____.
 A. Bicarbonate, liver
 B. Hydrogen, duodenum
 C. Bicarbonate, duodenum
 D. Bicarbonate, pancreas
- Q.55 Hepatic and pancreatic secretions are also stimulated by a hormone called:
 A. Gastrin
 B. Secretin
 C. HCl
 D. Enterokinase
- Q.56 Which of the following is not a component of pancreatic juice?
 A. NaHCO_3
 B. Amino peptidase
 C. Chymotrypsinogen
 D. Amylopsin
- Q.57 All principal components of food can be digested by:
 A. Gastric juice
 B. Pancreatic juice
 C. Bile
 D. Oral secretions
- Q.58 Which of the following statement regarding liver is incorrect?
 A. It produces no digestive enzyme
 B. Detoxify chemicals and drugs
 C. Filters blood
 D. Produces albumin and prothrombin
- Q.59 The emulsification of fats is the role of: (MDCAT 2015)
 A. Saliva
 B. Gastrin
 C. Pancreatic juice
 D. Bile
- Q.60 Chemical gall stones are:
 A. Calcium oxalate molecules
 C. Calcium phosphate molecules
 B. Cholesterol molecules
 D. Uric acid molecules

Digestion in Large Intestine

- Q.61 The longest part of large intestine is:
 A. Caecum
 B. Rectum
 C. Colon
 D. Anus

PMC Topic-9

- Q.62 The large intestine in human:
A. Digests all type of food
C. Absorbs H₂O + electrolytes
- Q.63 Movement of materials across ileum to large intestine is guarded by:
A. Pyloric sphincter
C. Cardiac sphincter
- Q.64 Find out correct labeling:



- A. A- Ascending colon, B- Ileocaecal valve, C- Ileum, D- Appendix, E- Caecum
B. A- Rectum, B- Ileocaecal valve, C- Appendix, D- Small intestine, E- Colon
C. A- Transverse colon, B- Ileocaecal valve, C- Jejunum, D- Ileum, E- Caecum
D. A- Colon, B- Ileocaecal valve, C- Appendix, D- Ileum, E- Rectum

- Q.65 In human, *Escherichia coli* is involved in the formation of: (MDCAT 2014)
A. Calcium
C. Vitamin D
B. Vitamin A
D. Vitamin K
- Q.66 Appendix is finger like process arise from: (MDCAT 2017)
A. Colon
C. Rectum
B. Caecum
D. Small intestine
- Q.67 The first part of the large intestine is: (MDCAT 2018)
A. Caecum
C. Rectum
B. Colon
D. Appendix

Some Common Disorders Related to Human Digestive System

- Q.68 Oral rehydration salts is given as a treatment in case of:
A. Dyspepsia
C. Obesity
B. Food poisoning
D. Piles
- Q.69 When a person has an abnormal amount of fat on the body it is called:
A. Dyspepsia
C. Obesity
B. Anorexia nervosa
D. Piles

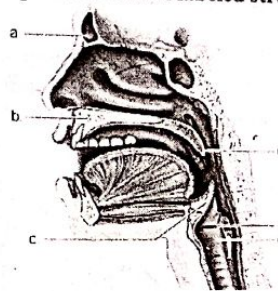
GASEOUS EXCHANGE/RESPIRATORY SYSTEM

Anatomy of Human Respiratory System

- Q.70 Mucus secreting goblet cells are present in: (KMDC 2014)
A. Larynx
C. Epiglottis
B. Glottis
D. Trachea

PMC Topic-9

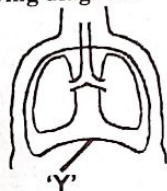
- Q.71 All of the following are lined with mucous membrane of ciliated epithelium except:
A. Nasal cavity
C. Bronchi
B. Trachea
D. Bronchioles
- Q.72 Which of the following function is not associated with nasal cavity?
A. Filtration
C. Moistening
B. pH adjustment
D. Temperature adjustment
- Q.73 A complex cartilaginous structure surrounding the upper end of the trachea:
A. Larynx
C. Pharynx
B. Esophagus
D. Epiglottis
- Q.74 A muscularly controlled cartilage, hinge-like action and serves as a lid which automatically covers the opening of the larynx is called:
A. Epiglottis
C. Uvula
B. Esophageal sphincter
D. Respiratory valve
- Q.75 Opening from nose to throat is closed by:
A. Epiglottis
C. Soft palate
B. Esophageal sphincter
D. Tongue
- Q.76 A cavity bounded by ribs and diaphragm is called:
A. Abdominal cavity
C. Pelvic cavity
B. Thoracic cavity
D. Pleural cavity
- Q.77 Diameter of bronchioles is:
A. 1mm
C. 1µm
B. 0.1mm
D. 1nm
- Q.78 Bronchioles are made up of mainly:
A. Connective tissues
C. Circular smooth muscles
B. Goblet cells
D. Endothelial cells
- Q.79 Functional units of lungs are:
A. Alveoli
C. Air sacs
B. Bronchioles
D. Epithelial cells
- Q.80 Each air sac consists of several microscopic alveoli which are:
A. Double layered structures
C. Triple layered structures
B. Single layered structures
D. Multi layered structures
- Q.81 A sheet of skeletal muscles forming the floor of chest cavity is called:
A. Pleura
C. Diaphragm
B. Peritoneum
D. Serosa
- Q.82 All of the following correctly explain the role of labeled structure in given figure except:



- A. d: Voice box
C. f: Common opening for food and air
B. e: Obstruct entry of food into nasal cavity
D. c: Separates respiratory and digestive tract

PMC Topic-9

- Q.83 The function of nasal cavity is:
A. Protection
C. Temperature regulation
B. Moisten
D. All A, B and C
- Q.84 The epithelium of alveoli is:
A. Ciliated epithelium
C. Cuboidal epithelium
B. Squamous epithelium
D. Columnar epithelium
- Q.85 How many functional pairs of vocal cords are present in humans?
A. 1
C. 2
B. 3
D. 4
- Q.86 Trachea lies _____ to the esophagus.
A. Dorsal
C. Ventral
B. Medial
D. Lateral
- Q.87 _____ are folds of tissue within the larynx, creates sounds when vibrate.
A. Vocal cords
C. Glottis
B. Epiglottis
D. Trachea
- Q.88 Human pharynx is conventionally divided into _____ sections.
A. 1
C. 3
B. 2
D. 4
- Q.89 The respiratory bronchioles terminate in elongated airways called:
A. Alveolar sacs
C. Alveolar duct
B. Bronchi
D. Alveoli
- Q.90 Cartilage rings present in trachea which prevent it from collapsing and keep the air passage way open, are:
A. "O" shaped
C. "D" shaped
B. "C" shaped
D. "G" shaped
- Q.91 Vocal cords are stretched across:
A. Larynx
C. Pharynx
B. Glottis
D. Bronchi
- Q.92 Site of gaseous exchange in humans is:
A. Trachea
C. Alveoli
B. Bronchus
D. Nose
- Q.93 During breathing air from pharynx enters to:
A. Alveoli
C. Bronchioles
B. Bronchi
D. Trachea
- Q.94 Respiratory tubules are termed as bronchioles when they attain the diameter of _____ or lesser.
A. 1.2 cm
C. 1 cm
B. 1 mm
D. 1.2 mm
- Q.95 Label the part 'Y' in the following diagram:
A. Pleura
C. Diaphragm
B. Chest cavity
D. Inter-coastal muscle



(MDCAT 2017)

(MDCAT 2018)

(MDCAT 2017)

(MDCAT 2017)

- Q.96 In the passageways of the respiratory system mucus secreting cells called:
A. Tracheal cells
C. Surfactant cells
B. Goblet cells
D. Pleural cells
- Q.97 Function of respiratory passage, cilia is to keep the airways clear from:
A. CO₂
C. Dust
B. O₂
D. CO

(NTS 2019)

Mechanism of Breathing

- Q.98 The chemical nature of surfactant is:
A. Glycolipids
C. Glycoproteins
B. Nucleoproteins
D. Lipoproteins
- Q.99 In humans, the respiratory center is:
A. Cerebrum
C. Pons
B. Medulla oblongata
D. Midbrain
- Q.100 Inspiratory center is _____ portion of medulla:
A. Ventral
C. Dorsal
B. Lateral
D. Both B & C
- Q.101 Surfactant is present in:
A. Bronchi
C. Bronchioles
B. Alveoli
D. Trachea
- Q.102 Which of the following is not a function of surfactants?
A. Filtration of blood
C. Reduce surface tension
B. Increase gases exchange
D. Act as antiseptic
- Q.103 During exercise, the breathing rate may rise to:
A. 15 times per minute
C. 30 times per minute
B. 20 times per minute
D. 25 times per minute
- Q.104 Which energy is consumed in breathing?
A. Chemical
C. Potential
B. Physical
D. Mechanical
- Q.105 Find out the incorrect statement:
A. Inspired air contains more O₂ than exhaled air
C. Amount of N₂ is equal in both inhaled and exhaled air
B. Expired air has 100 times greater CO₂ as inspired air
D. Exhaled air is comparatively drier than inhaled air
- Q.106 During inspiration fresh air moves in, which has high percentage of:
A. CO
C. N₂
B. O₂
D. CO₂
- Q.107 Partial pressure of oxygen is maximum in:
A. Inspired air
C. Expired air
B. Alveolar air
D. Oxygenated blood
- Q.108 Which of the following play passive role during breathing?
A. Lungs
C. Diaphragm
B. Intercostal muscles
D. Pleura
- Q.109 Which of the following factors does not alter the rate of breathing by influencing the chemoreceptors in medulla oblongata, aorta and carotid artery?
A. CO₂ partial pressures in the blood
C. O₂ partial pressures in the blood
B. H⁺ concentration in the blood
D. Blood glucose level

PMC Topic-9

- Q.110 If you hold your breath for a long time, CO₂ levels are likely to _____, and the pH of body fluids is likely to _____.
- A. Increase, decrease
B. Increase, increase
C. Decrease, Increase
D. Decrease, decrease
- Q.111 During expiration, the diaphragm becomes:
- A. Less dome-shaped
B. Oblique
C. Flattened
D. More dome-shaped
- Q.112 During inspiration, the diaphragm:
- A. Contracts and relax
B. Contracts and goes downward
C. Relax and rises
D. Relax and goes downward
(MDCAT 2016)
- Q.113 Breathing consists of:
- A. Four phases
B. One phase
C. Three phases
D. Two phases
- Q.114 The low levels of surfactant produced by alveolar epithelium causes:
- A. Emphysema
B. Respiratory distress syndrome
C. Bronchitis
D. Asthma
(MDCAT 2018)
- Q.115 During inspiration the space inside the chest cavity is increased due to:
- A. Increased pressure
B. Relaxation of the external intercostal muscle
C. The relaxation of the muscle of the diaphragm
D. The contraction of the muscles of the diaphragm
(MDCAT 2019)

Transport of Respiratory Gases

- Q.116 Diffusion of respiratory gases is inversely proportional to:
- A. Surface area
B. Thickness of the membrane
C. Difference in concentration
D. Presence of moisture
- Q.117 At normal alveolar ventilation, the respiratory center is stimulated by:
- A. O₂ concentration in venous blood
B. CO₂ concentration in venous blood
C. CO₂ concentration in arterial blood
D. O₂ concentration in arterial blood
- Q.118 Which one of these shows the path of blood after it leaves the lungs?
- A. Pulmonary Vein – Left Atrium – Left Ventricle – Aorta
B. Pulmonary Vein – Right Atrium – Right Ventricle – Aorta
C. Pulmonary Artery – Left Atrium – Left Ventricle – Aorta
D. Pulmonary Artery – Right Atrium – Right Ventricle – Aorta
- Q.119 Which of the following correctly describes the binding affinities of gases with haemoglobin?
- A. CO > CO₂ > O₂
B. CO₂ > O₂ > CO
C. O₂ > CO₂ > CO
D. O₂ > CO₂ > CO
- Q.120 Just after inhalation, the highest partial pressure of oxygen will be in:
- A. B and C
B. Only A
C. D and E
D. Only E
- Q.121 All of the following occur due to presence of carbon dioxide in blood except:
- A. Increases rate of breathing
B. Increases respiratory volume
C. Makes blood more acidic
D. Oxygen carrying capacity of Hb decreases

- Q.122 The amount of CO₂ in pulmonary artery is:
- A. 54ml/100ml of blood
B. 50ml/100ml of blood
C. 60ml/100ml of blood
D. 4ml/100ml of blood
- Q.123 Which of the following incorrectly explains the binding of inorganic component in structures found in erythrocytes?
- A. CO with organic portion of haem
B. CO₂ with NH₂ group of haemoglobin
C. O₂ with Fe⁺⁺ of haem
D. H⁺ with COOH group of haemoglobin
- Q.124 Which of the following shows maximum solubility in blood plasma?
- A. Oxygen
B. Carbon dioxide
C. Nitrogen
D. Carbon monoxide
- Q.125 Amount of oxygen absorbed by haemoglobin at 115 mmHg per 100 ml of blood is:
- A. 20 ml
B. 16 ml
C. 13.4 ml
D. 19.6 ml
- Q.126 All of the following can bind to haemoglobin except:
- A. HCO₃⁻
B. O₂
C. H⁺
D. CO₂
- Q.127 O₂ pressure in cells or tissues is:
- A. 158 mmHg
B. Less than 100 mmHg
C. 115 mmHg
D. Less than 60 mmHg
- Q.128 The oxygen content of fresh air is about:
- A. 200 ml/liter
B. 400 ml/liter
C. 300 ml/liter
D. 500 ml/liter
- Q.129 All of the following facilitates the release of O₂ from haemoglobin except:
- A. High CO₂ concentration
B. High pH
C. High temperature
D. High Acidity
- Q.130 In reduced form, hemoglobin carries:
- A. CO₂
B. O₂
C. Hydrogen ion
D. CO
- Q.131 Which of the following has maximum oxygen carrying capacity?
- A. Haemoglobin in erythrocytes
B. Globulin in blood plasma
C. Myoglobin in sarcoplasm
D. Bicarbonate ions in RBCs
- Q.132 About 70-85% CO₂ in blood is carried:
- A. As carboxylase myoglobin
B. Freely as CO₂
C. With proteins in plasma
D. As bicarbonate
(MDCAT 2015)
- Q.133 Carboxyhemoglobin (10-20%) is formed when CO₂ combines with:
- A. Amino group of haemoglobin
B. Haem portion of haemoglobin
C. Iron part of haemoglobin
D. Plasma proteins
(MDCAT 2016)
- Q.134 Low partial pressure of oxygen in tissues favors _____ of oxyhaemoglobin.
- A. Dissociation
B. Stability
C. Formation
D. Transformation
(MDCAT 2017)
- Q.135 Gaseous exchange in animals takes place with the help of process called as:
- A. Active transport
B. Cyclosis
C. Phagocytosis
D. Diffusion
(MDCAT 2017)

PMC Topic-9

Respiratory Volumes and Capacities

- Q.136 Tidal volume of lungs is:
A. 5 liter
B. 0.5 liter
C. 1.5 liter
D. 3500 ml
- Q.137 The residual volume is:
A. 5 liter
B. 1.5 liter
C. 500 ml
D. 3500 ml
- Q.138 Inspiratory reserve volume is:
A. 3000 ml
B. 6000 ml
C. 5000 ml
D. 3500 ml

Role of Respiratory Pigments

- Q.139 Which of the following is false regarding to haemoglobin?
A. It is a globular protein
B. It contains organic haem group and inorganic Fe⁺⁺
C. Abundantly found in RBCs
D. Each haem in haemoglobin can bind to four O₂ molecules
- Q.140 Hemoglobin in man increases oxygen carrying capacity by:
A. 80 times
B. 75 times
C. 90 times
D. 100 times
- Q.141 The characteristic red color of hemoglobin is due to:
A. Haem
B. β-globin chains
C. α-globin chains
D. Central iron atom
- Q.142 What is true about haemoglobin?
A. It is dipeptide and present in RBC
B. It is dipeptide in mammals and localized in RBC
C. It is present in dissolved state in blood plasma
D. It is having haem group
- Q.143 Which of the following statement is correct about the respiratory pigments?
(MDCAT 2018)
A. Albumin, globulin and globular proteins are present in respiratory pigments
B. Myoglobin and haemoglobin has higher affinity for nitrogen
C. Myoglobin has more affinity for oxygen as compared to haemoglobin
D. Cyanide and haemoglobin has low affinity for oxygen

Respiratory Disorders

- Q.144 All are respiratory disorders except:
A. Pulmonary tuberculosis
B. Emphysema
C. Rickets
D. Lungs Cancer
- Q.145 In heavy smokers, the alveoli become enlarged and damaged which reduces the surface area for the exchange of respiratory gases. This condition is called:
A. Lung cancer
B. Emphysema
C. Asthma
D. Bronchitis
- Q.146 Which of the following is a respiratory disorder related to malnutrition?
(MDCAT 2017)
A. Cancer
B. Emphysema
C. Asthma
D. Tuberculosis
- Q.147 Breakdown of thin wall of alveoli occurs in:
(MDCAT 2017, 2018, 2019)
A. Emphysema
B. T.B
C. Cancer
D. Asthma

TRANSPORT IN PLANTS

Uptake and Transport of Minerals

- Q.148 Active transport is selective and is dependent upon:
A. Photosynthesis
B. Respiration
C. Transportation
D. Permeability
- Q.149 The site/s where most of the uptake of water and minerals take place is/are:
A. Root hairs
B. Root cells
C. Underground stem
D. Leaves
- Q.150 The roots bear a dense cluster of tiny hair like structures which are extensions of:
A. Mesodermal cells
B. Epidermal cells
C. Endodermal cells
D. Epithelial cells
- Q.151 Transport of minerals from soil to epidermal cells of roots via carrier protein molecules along their concentration gradient is called:
A. Diffusion
B. Facilitated diffusion
C. Passive transport
D. Active transport

Water Potential

- Q.152 The water potential of pure water is:
A. Zero
B. One
C. Infinity
D. Negative
- Q.153 To attain maximum turgidity of a cell, it must be placed in:
A. Normal saline
B. Distilled water
C. Glucose solution
D. Away from sunlight
- Q.154 In a _____ solution, solute and pressure potentials are equal to water potential.
A. Hyperplasmotic
B. Isotonic
C. Hypertonic
D. Hypotonic

Uptake of Water by Roots

- Q.155 Apoplast pathway can take water and minerals up to:
A. Xylem
B. Cortex
C. Endodermis
D. Pericycle
- Q.156 The membrane of vacuoles is known as:
A. Cisternae
B. Tonoplast
C. Cristae
D. Protoplast
- Q.157 The pathway adopted by water in plants through adjacent cell walls is:
A. Apoplast pathway
B. Symplast pathway
C. Vacuolar pathway
D. Tonoplast pathway
- Q.158 In plants, the neighboring cells are connected with one another by:
A. Plasmodesmata
B. Cell walls
C. Vacuoles
D. Casparian strips
- Q.159 In the root cells _____ pathway becomes discontinuous in the endodermis due to the presence of casparian strips.
A. Tonoplast
B. Apoplast
C. Symplast
D. Vacuolar
- Q.160 Water and minerals move down their concentration gradient through plasmodesmata, to cells of cortex, endodermis, pericycle and then to sap in the xylem cells. This is also known as the:
(MDCAT 2019)
A. Symplast pathway
B. Vacuolar pathway
C. Mineral absorption pathway
D. Apoplast pathway

PMC Topic-9

Q.161 In roots the apoplast pathway of water is disrupted when water reaches: (PMC 2020)

- A. Plasmodesmata
- B. Cortex
- C. Endodermis
- D. Pith

Ascent of Sap

Q.162 Hydrogen bonding between water molecules produces:

- A. Cohesion
- B. Adhesion
- C. Tension
- D. Attraction

Q.163 Four plants are present in different environmental conditions. Plant A is present in warm climate with continuous rainfall, plant B is present in a cool forest, plant C is present in warm climate with little breeze while plant D is present in warm climate high wind speed. Which one of the above plants will have highest rate of transpiration? (MDCAT 2019)

- A. Plant B
- B. Plant C
- C. Plant D
- D. Plant A

Translocation of Organic Solutes

Q.164 Translocation of sucrose is between:

- A. Sink to source
- B. Sink to sink
- C. Source to sink
- D. Source to source

Q.165 Widely accepted theory that explains transport of organic solutes in plants is supported by:

- A. Pressure flow theory
- B. Diffusion
- C. Imbibition
- D. Ascent of sap

Q.166 Loading of sucrose from companion cells to sieve tube cell is:

- A. Diffusion
- B. Active transport
- C. Passive transport
- D. Facilitated diffusion

TRANSPORT IN HUMANS/CARDIOVASCULAR SYSTEM

Blood

Q.167 About 55% of the volume of human blood is: (SMBBMH 2015)

- A. Plasma
- B. Blood cells
- C. Blood Protein
- D. A and B

Q.168 All of the following protect the body against entrance of germs except: (NTS 2017)

- A. Tears
- B. Mucus membrane
- C. WBCs
- D. Ciliated cells
- E. RBCs

Q.169 The type of blood cells that have biconcave disc like shape are: (AJK 2019)

- A. Lymphocytes
- B. Platelets
- C. Monocytes
- D. Red blood cells

Q.170 The cells which play very important role in developing immunity are: (PMC 2020)

- A. Monocytes
- B. Lymphocytes
- C. Neutrophils
- D. Thrombocytes

Q.171 Antibodies are manufactured in: (PMC 2020)

- A. T lymphocytes
- B. Platelets
- C. Red blood cells
- D. B lymphocytes

PMC Topic-9

Q.172 The average life span of red blood cell is about:

- A. Four months
- B. Five months
- C. Two months
- D. One month

Structure of Human Heart

Q.173 Chordae tendinae are extension of:

- A. Heart
- B. Ventricles
- C. Auricles
- D. Sinus venosus

Q.174 Which one has the thickest walls than the others?

- A. Right atria
- B. Left atria
- C. Right ventricle
- D. Left ventricle

Q.175 The nature of valves in the heart is:

- A. Membranous
- B. Muscular
- C. Tendinous
- D. Ligamentous

Q.176 Oxygenated blood is supplied to all body parts from:

- A. Right atrium
- B. Left atrium
- C. Right ventricle
- D. Left ventricle

Q.177 Mitral valve prevents the flow of blood from:

- A. Right atrium to right ventricles
- B. Left atrium to left ventricles
- C. Right atrium to left atrium
- D. Left ventricles to left atrium

Q.178 First artery that arises from the base of aorta:

- A. Pulmonary artery
- B. Coronary artery
- C. Renal artery
- D. Iliac arteries

Q.179 At start of ventricular contraction:

- A. Bi and tricuspid valves are opened
- B. Semilunar valves are closed
- C. Bi and tricuspid valves are opened and semilunar valves are closed
- D. Bi and tricuspid valves are closed and semilunar valves are opened

Q.180 Which valve allows blood to pass from heart to pulmonary artery?

- A. Right Semi lunar valve
- B. Left AV valve
- C. Left Semi lunar valve
- D. Right AV valve

Q.181 Myocardium of heart shows _____ characters.

- A. Smooth and involuntary
- B. Smooth and voluntary
- C. Striated and involuntary
- D. Striated and voluntary

Q.182 In humans, only _____ systemic arch is present.

- A. Left
- B. Superior
- C. Right
- D. Inferior

Q.183 The heart muscle is nourished by:

- A. Chambers of the heart
- B. Right atrium
- C. Coronary artery
- D. Left atrium

Q.184 Which one is continuation of iliac artery?

- A. Renal Artery
- B. Femoral Artery
- C. Hepatic Artery
- D. Intercostal Arteries

Q.185 Which vein has oxygenated blood?

- A. Renal vein
- B. Pulmonary vein
- C. Subclavian vein
- D. Jugular vein

PMC Topic-9

- Q.186 In man, blood from alimentary canal to liver is transported by:
A. Hepatic portal vein
B. Hepatic vein
C. Pulmonary vein
D. Renal vein (MDCAT 2014)
- Q.187 The oxygenated blood from lungs to heart is transported by the:
A. Pulmonary artery
B. Pulmonary vein
C. Coronary artery
D. Hepatic artery (MDCAT 2015)
- Q.188 Right atrium is separated from right ventricle by:
A. Bicuspid Valve
B. Tricuspid Valve
C. Semilunar Valve
D. Interatrial Septum (MDCAT 2015)
- Q.189 The flaps of tricuspid valves are attached to muscular extensions of right ventricle known as:
A. Smooth Muscles
B. Intercostal Muscles
C. Papillary Muscles
D. Skeletal Muscles (MDCAT 2016)
- Q.190 In human the closed sac which surrounds the heart is:
A. Endocardium
B. Pericardium
C. Myocardium
D. Epicardium (MDCAT 2016)
- Q.191 Chordae tendineae are the fibrous cords attached with:
A. Cardiac end of stomach valve
B. Pyloric sphincter of stomach
C. Tricuspid valve of heart
D. Eyelid (MDCAT 2016)
- Q.192 Bicuspid valve controls the flow of blood from:
A. Right atrium to right ventricle
B. Left ventricle to aorta
C. Right ventricle to pulmonary artery
D. Left atrium to left ventricle (MDCAT 2016)
- Q.193 The thickest chamber of human heart is:
A. Left atrium
B. Right atrium
C. Left ventricle
D. Right ventricle (MDCAT 2018)
- Q.194 Purkinje fibers are connected with the impulse conducting system of:
A. Heart
B. Brain
C. Skin
D. Nephron (ETEA 2019)
- Q.195 Regarding structure of human heart chordae tendinae are present in:
A. Atria
B. Renal
C. Pulmonary valve
D. Ventricle (PMC 2020)
- Q.196 The valves controlling the one-way flow of blood from atria to ventricles are:
A. Semilunar valves
B. Sinoatrial valve
C. Bicuspid and tricuspid valves
D. Septum (AJK 2019)
- Q.197 In human heart the left atrium receives:
A. The superior vena cava
B. The coronary sinus
C. The inferior vena cava
D. The four pulmonary veins (PMC 2020)

The Cardiac Cycle

- Q.198 The most appropriate statement for atrial systole is:
A. A.V valves close
B. A.V valves open
C. A.V valves open and semilunar valves close
D. A.V valves close and semilunar valves open

PMC Topic-9

- Q.199 At the end of ventricle contraction:
A. A.V valves open
B. Semilunar valves open
C. A.V valves open and semilunar valves close
D. Both A.V and semilunar valves close
- Q.200 Lubb sound is produced when:
A. A.V valves open
B. Semilunar valve close
C. A.V valves close
D. Semilunar valve open
- Q.201 Ventricular systole requires about:
A. 1 sec
B. 0.8 sec
C. 0.1 sec
D. 0.3 sec
- Q.202 The second heart sound is produced by:
A. Closure of AV valves
B. Opening of AV valves
C. Closure of Semilunar valves
D. Opening of Semilunar valves
- Q.203 One complete heart beat consists of one systole and one diastole and lasts for about:
A. 0.8 sec
B. 0.4 sec
C. 0.2 sec
D. 0.5 sec (MDCAT 2015, 2017)
- Q.204 Which statement is correct about atrial systole?
A. Atria relax and ventricles contract
B. Atria contract and ventricle also contract
C. Atria and ventricles are relaxed
D. Ventricles remain relax while atria contract (MDCAT 2018)
- Mechanism of Heart Excitation and Contraction**
- Q.205 Heart cycle is naturally initiated by:
A. S.A node
B. A.V node
C. Battery
D. Henson node
- Q.206 The portion of heart which is always ready to be the pacemaker if SA node stops working:
A. Bundle branch
B. AV node
C. Ventricle Muscles
D. Atrial Muscles
- Q.207 The heart beat cycle starts when electric impulses are generated from:
A. AV Node
B. SA Node
C. SV Node
D. PQ Node (MDCAT 2015)
- Q.208 Which one of the following act as a pacemaker in heart?
A. Atria ventricular node
B. Sino-atrial nod
C. Atria ventricular bundles of fibers
D. Bundle of His (MDCAT 2018)
- Q.209 In ECG, QRS complex represent:
A. Atrial systole
B. Atrial diastole
C. Ventricle systole
D. Ventricle diastole (MDCAT 2017, ETEA 2018)
- Q.210 Atrial depolarization is represented by:
A. P wave
B. QRS Complex
C. T wave
D. PQRS
- Q.211 The waves of ECG shows mainly:
A. Blood pressure
B. Electrical Events
C. Mechanical Events
D. Chemical Events

Blood Vessels

- Q.212 Arteriosclerosis is:
 A. A metabolic disorder
 C. An infectious disorder
- Q.213 The only vein in the human body carrying oxygenated blood is: (PMC 2020)
 A. Femoral
 C. Pulmonary
- Q.214 Which of the following blood vessels contain semilunar valves? (MDCAT 2019)
 A. Arteries
 C. Veins
- B. A degenerative disorder
 D. A genetic disorder
- B. Renal
 D. Iliac
- B. Arterioles
 D. Capillaries

Blood Pressure and Rate of Blood Flow

- Q.215 Which of the following blood vessels have the highest pressure of blood? (PMC 2020)
 A. Aorta
 C. Pulmonary arteries
- B. Pulmonary veins
 D. Vena cava

Lymphatic System

- Q.216 All are functions of lymphatic system except:
 A. Transport fat
 C. Blood filtration
- Q.217 Lymph is not present in:
 A. Lacteal
 C. Left thoracic lymphatic duct
- Q.218 Which one is more closely related to lymph?
 A. CSF
 C. Blood
- Q.219 Lymph nodes are drained by:
 A. Single afferent vessel
 C. Many afferent vessels
- Q.220 Largest lymphoid mass is:
 A. Thymus
 C. Adenoid
- Q.221 Flow of lymph is maintained by:
 A. Skeletal muscles
 C. Breathing movements
- Q.222 Just as blood is filtered by spleen, the lymph is filtered by:
 A. Spleen
 C. Tonsils
- Q.223 Lymph just before entering into subclavian vein always passes through:
 A. Heart
 C. Groin lymph nodes
- Q.224 Return of lymph from lower leg is assisted by:
 A. Lymph nodes
 C. Calf muscles
- Q.225 After taking too much fat, the lymph consists of how many fat globules?
 A. 10%
 C. 20%
- B. Provide immunity
 D. Filtration of urea
- B. Lymph node
 D. Left subclavian vein
- B. Interstitial fluid
 D. Urine
- B. Single efferent vessel
 D. Many efferent vessels
- B. Spleen
 D. Tonsils
- B. Visceral movements
 D. All A, B, C
- B. Lymph nodes
 D. Liver
- B. Abdominal vessels
 D. Thoracic lymphatic duct
- B. Venous valves
 D. Cytokines
- B. 1%
 D. 8%

- Q.226 The lymphatic vessels of the body empty the lymph into blood stream at the:
 A. Abdominal vein
 C. Sub-clavian vein
- Q.227 The lymph vessel of villi is called:
 A. Epithelium
 C. Afferent lymph vessel
- Q.228 Thoracic lymph duct of the lymphatic system opens into _____.
 A. Superior vena cava
 C. Sub-clavian vein
- Q.229 Large lymph vessels ultimately form larger lymph duct, which drains its lymph into:
 A. Carotid and Aorta
 C. Sub-clavian artery
- B. Jugular vein
 D. Bile duct
- B. Adrenals
 D. Lacteal
- B. Inferior vena cava
 D. Renal vein
- B. Sub-clavian Vein
 D. Vena cava and Aorta
- (MDCAT 2015)
- (MDCAT 2017)
- (MDCAT 2019)

Immune System

- Q.230 Common feature of cell humoral response and cell mediated response are:
 A. Recognition of antigen
 C. Production of antibodies
- Q.231 Vaccination against specific disease like tetanus is an example of:
 A. Artificial active immunity
 C. Artificial passive immunity
- Q.232 Antibodies are injected in:
 A. Artificial active immunity
 C. Artificial passive immunity
- Q.233 Antibodies consist of:
 A. One Heavy chain only
 C. Two heavy and two light chains only
- Q.234 Antibodies are an example of _____ proteins.
 A. Fibrous
 C. Catalytic
- Q.235 Antigen binding sites are present on:
 A. Constant region of heavy chain only
 B. Constant region of light chain only
 C. Variable region of both heavy and light chains
 D. Constant region of both heavy and light chains
- Q.236 Any foreign body that may activate immune system:
 A. Antigen
 C. Antibodies
- Q.237 Immunity is the capacity of body to do all except:
 A. Recognize antigen
 C. Increase antibodies production
- Q.238 Immunity is generally destroyed in:
 A. All infections
 C. All inflammations
- Q.239 Specific immunity is the result of:
 A. 1st line of defense
 C. 2nd line of defense
- B. Tissue rejection
 D. Plasma clone formation
- B. Natural active immunity
 D. Natural passive immunity
- B. Natural active immunity
 D. Natural passive immunity
- B. Two heavy chains only
 D. Two light chains only
- B. Globular
 D. Regulatory
- B. Immunoglobulin
 D. Plasmogen
- B. Mobilize lymphocytes
 D. Mobilize hemoglobin
- B. HIV infection
 D. All diseases
- B. 3rd line of defense
 D. 4th line of defense

PMC Topic-9

- Q.240 Phagocytosis usually involves:
A. 1st line of defense
C. 2nd line of defense
B. 3rd line of defense
D. 4th line of defense
- Q.241 All are examples of 1st line of defense except:
A. Skin
C. Stomach HCl
B. Mucous
D. Antibodies
- Q.242 Cyclosporine is used to inhibit which type of response?
A. Cell mediated
C. Cell signaling
B. Cell humoral
D. Cell to cell
- Q.243 Type of immunity that is present by birth is called:
A. Innate immunity
C. Acquired immunity
B. Adaptive immunity
D. Secondary immunity
- Q.244 All are true about passive immunization except:
A. Antibodies are injected
C. Antitoxin are injected
B. Antisera are injected
D. Antibodies are produced
- Q.245 Disulfide bridge is present between all except:
A. Heavy -Heavy chains
C. Heavy- light chain
B. Light and heavy chain
D. Light and light chain
- Q.246 Vaccination is not available for which of the following disease:
A. Bacterial
C. Viral
B. Fungal
D. Microbial
- Q.247 Stronger and specific immunity is found in:
A. All animals
C. Invertebrates only
B. Humans only
D. All vertebrates
- Q.248 An antigen is:
A. Residue of antibody
C. Stimulus for antibody formation
B. Result of antibody
D. Opposite to an antibody
- Q.249 A vaccine contains:
A. Antigens
C. Antibodies
B. Macrophages
D. All A, B, C
- Q.250 Vaccine is prepared by using a microorganism that shows association to disease. Antigen Humoral immune response is generated by:
A. B lymphocytes
C. T lymphocytes
B. Basophils
D. Neutrophils
- Q.251 B-lymphocytes originate in human from:
A. Blood cells
C. Bone marrow
B. Bursa of Fabricius
D. Thymus
- Q.252 Which part of antibody recognizes the antigen during immune response?
A. Heavy part
C. Light part
B. Constant part
D. Variable part
(MDCAT 2014)
- Q.253 Which one of the following glands is involved in the production of lymphocytes?
A. Pineal
C. Pituitary
B. Thymus
D. Adrenal
(MDCAT 2014)

PMC Topic-9

- Q.254 Antibodies are proteins and made up of how many polypeptide chains?
A. One
C. Two
B. Three
D. Four
(MDCAT 2014, 2017)
- Q.255 T-lymphocytes recognize antigen and attack microorganisms or transplanted organ and tissues. This effect is called:
A. Cell-mediated response
C. Humoral immune response
B. Active immunity
D. Passive immunity
(MDCAT 2014)
- Q.256 What type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum?
A. Active immunity
C. Passive immunity
B. Artificially induced immunity
D. Naturally induced immunity
(MDCAT 2014, 2017)
- Q.257 Lymphocytes function as to:
A. Engulf bacteria
C. Produce antibodies
B. Produce histamine and heparin
D. Initiate blood clotting
(SMBBMC 2014)
- Q.258 B-lymphocytes are named due to their relationship with:
A. Blood
C. Bursa of Fabricius
B. Bone Marrow
D. Bile Duct
(MDCAT 2015)
- Q.259 In _____ response, B-cells produce plasma cells that synthesize antibodies and release in blood plasma and tissue fluid.
A. Cell-Mediated
C. Hormonal
B. Humoral
D. Phototactic
(MDCAT 2015, 2016, NTS 2017)
- Q.260 Response of body against the transplanted organ is:
A. Homeostatic Response
C. Behavioral Response
B. Primary Response
D. Cell-mediated Response
(MDCAT 2015)
- Q.261 Passive immunity is used against:
A. Malaria
C. Typhoid
B. Dengue
D. Tetanus
(MDCAT 2015)
- Q.262 Variable amino acid sequences in antibody molecule are found in _____.
A. Both light chains only
C. Both heavy chains only
B. One heavy and one light chain
D. Both heavy and light chains
(MDCAT 2016)
- Q.263 The type of immunity in which antibodies are passed from one individual to another is called:
A. Passive Immunity
C. Artificial Active Immunity
B. Natural Active Immunity
D. Humoral Immunity
(MDCAT 2016)
- Q.264 To combat the active infections of tetanus, rabies and snakes the _____ method of immunization is used.
A. Active
C. Humoral
B. Active Artificial
D. Passive
(MDCAT 2016)
- Q.265 _____ cells survive for a few days and secrete a huge no. of antibodies in blood, tissue fluids or lymph.
A. Memory cells
C. B-lymphocytes
B. T-lymphocytes
D. Plasma cells
(MDCAT 2017)

- Q.266 Vaccination is:
A. Natural active immunity
C. Natural passive immunity
- Q.267 In immunoglobulins/antibodies, two light chains and two heavy chains are linked to each other by?
A. Covalent bonds
C. Hydrogen bonds
- Q.268 Cell mediated immune response is given by:
A. Neutrophils
C. T lymphocytes
- Q.269 Anti-venom given after a snake bite venom is an example of:
A. Artificial active immunity
C. Natural active immunity
- Q.270 Now a day, every new born gets regular shots of vaccine for polio. It contains _____ for polio to make a child immune against this disease. (MDCAT 2019)
A. Antisera
C. Antibodies
- Q.271 A person got an infection, he became ill but then he survived. What do you think which type of immunity he would have developed? (MDCAT 2019)
A. Naturally induced active immunity
C. Artificially induced active immunity
- Q.272 The prevention of disease by artificial activation of immune response is possible by: (AJK 2019)
A. Gene therapy
C. Vaccines
- Q.273 Is a foreign substance, which stimulates the formation of antibodies. (AJK 2019)
A. Antibiotic
C. Archaea
- Q.274 Autoimmune diseases act at the principle of:
A. Self against antigens
C. Antigen against self
- B. Artificial active immunity
D. Artificial passive immunity
- B. Disulphide bonds
D. Ionic bonds
- B. Macrophages
D. B lymphocytes
- B. Artificial passive immunity
D. Natural passive immunity
- B. Antibiotics
D. Antigens
- B. Active immunity
D. Passive immunity
- B. Drugs
D. Antibodies
- B. Antigen
D. Transposon
- B. Self against self
D. Antigen self-destroyed

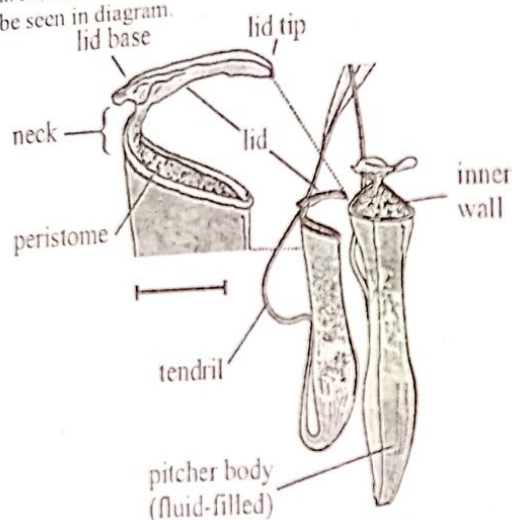
ANSWER KEY

21	C	41	A	61	C	81	C	101	B	121	B	141	A	161	C	181	C	201	D	221	D	241	D	261	D
22	A	42	D	62	C	82	C	102	A	122	A	142	D	162	C	182	A	202	C	222	B	242	A	262	D
23	A	43	C	63	B	83	D	103	C	123	A	143	C	163	C	183	C	203	A	223	D	243	A	263	A
24	C	44	A	64	A	84	B	104	A	124	B	144	C	164	C	184	B	204	D	224	C	244	D	264	D
25	C	45	A	65	D	85	C	105	D	125	D	145	B	165	A	185	B	205	A	225	B	245	D	265	D
26	C	46	B	66	B	86	C	106	C	126	A	146	D	166	B	186	A	206	B	226	C	246	B	266	B
27	C	47	D	67	A	87	A	107	A	127	D	147	A	167	A	187	B	207	B	227	D	247	D	267	B
28	B	48	C	68	B	88	C	108	A	128	A	148	B	168	E	188	B	208	B	228	C	248	C	268	C
29	C	49	A	69	C	89	C	109	D	129	B	149	A	169	D	189	C	209	C	229	B	249	A	269	B
30	C	50	C	70	D	90	B	110	A	130	C	150	B	170	B	190	B	210	A	230	A	250	A	270	D
31	D	51	B	71	D	91	A	111	D	131	A	151	B	171	D	191	C	211	B	231	A	251	C	271	A
32	A	52	C	72	B	92	C	112	B	132	D	152	A	172	A	192	D	212	B	232	C	252	D	272	C
33	D	53	A	73	A	93	D	113	D	133	A	153	B	173	B	193	C	213	C	233	C	253	B	273	B
34	C	54	D	74	A	94	B	114	B	134	A	154	B	174	D	194	A	214	C	234	B	254	D	274	B
35	D	55	B	75	C	95	C	115	D	135	D	155	C	175	B	195	D	215	A	235	C	255	A		
36	A	56	B	76	B	96	B	116	B	136	B	156	B	176	D	196	C	216	D	236	A	256	C		
37	D	57	B	77	A	97	C	117	B	137	B	157	A	177	D	197	D	217	D	237	D	257	C		
38	A	58	A	78	C	98	D	118	A	138	A	158	A	178	B	198	C	218	B	238	B	258	C		
39	A	59	D	79	C	99	B	119	A	139	D	159	B	179	D	199	D	219	B	239	B	259	B		
40	C	60	B	80	B	100	A	120	A	140	B	160	A	180	A	200	C	220	B	240	C	260	D		

EXPLANATORY NOTES

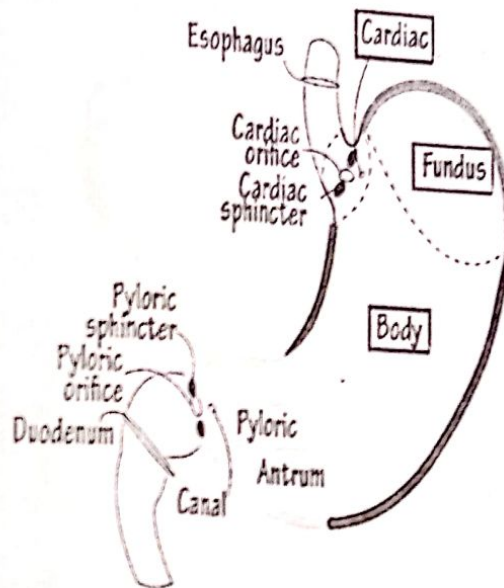
NUTRITION

- Insectivorous plants are both autotrophs and heterotrophs as they can photosynthesize but the soil in which they grow is nitrogen deficient so they capture insects for obtaining nitrogen.
- Sarracenia purpurea*, commonly known as the purple pitcher plant and a hood formed from its leaf can be seen in diagram.



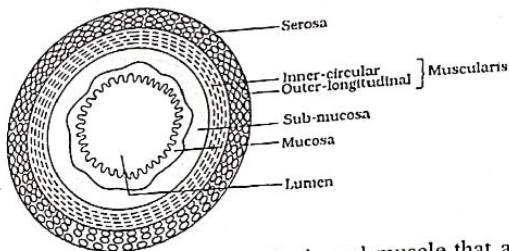
- Dodder is an annual seed-bearing parasitic vine while all others are insectivorous plants.
- Those animals which have tubular type digestive system are more complex as compared to sac like digestive system. Tube have two openings.
- Oral cavity, stomach and small intestine are the main sites of digestion.
- Mastication increases the surface area of food particles which provides site of action for enzymes and significantly improves the digestibility.
- Oral cavity has amylase enzyme and intestine has amylopsin, lactase and maltase for complete digestion of carbohydrates.
- Bolus is a partially digested food material by amylase in oral cavity which produces maltose that is disaccharide.
- Smell, taste and sight help for selection of food. Sound is not related to food selection.
- 1-Selection of food, 2-Mastication, 3-Lubrication, 4-Enzymetic digestion of food (starch) will occur in oral cavity.
- NaHCO_3 is bicarbonate which neutralizes the pH in acidic environment.
- Peristalsis is related to circular and longitudinal muscles of alimentary canal which starts after pushing of food to esophagus during swallowing process and this is initiated by tongue.
- Human digestive tract starts from oral cavity and ends at anus. Food in digestive tract moves downward with the help of peristaltic movements.
- Esophagus is a muscular tubular part which starts peristalsis in alimentary canal and secretes no enzyme.

- The main function of amylases is to hydrolyze the glycosidic bonds in starch molecules with in oral cavity, converting complex carbohydrates to simple sugars.
- The epiglottis is a leaf-shaped flap in the throat that prevents food from entering the windpipe and the lungs.
- Salivary amylase begins to digest starch to shorter polysaccharides and then to maltose.
- Human oral cavity have three types of salivary glands;
- Human oral cavity have three types of salivary glands;
 - Parotid gland
 - Submaxillary or submandibular gland
 - Sublingual gland

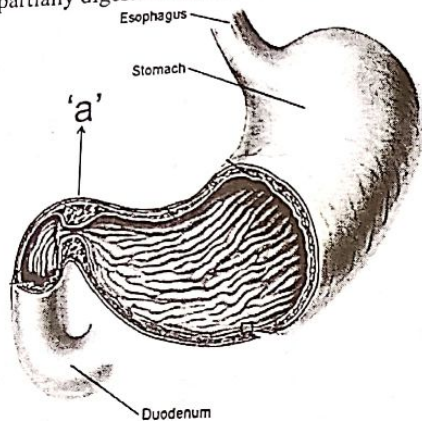


- High protein in food stimulates the release of gastrin which acts on epithelial cells to increase the secretion of stomach.
- Rennin is an enzyme in new born for colostrum digestion. Rennin is an enzyme released from stomach.
- As the middle layer is made up of smooth muscles which contract and relax and generate peristalsis which is responsible for contraction and relaxation.
- Pepsin is an active enzyme which converts proteins into polypeptides and peptones in stomach.
- Oral cavity is the site of digestion of ... stein, cellulose and fats are not digested.
- These glands are composed of three ... es: zymogens, parietal, and mucous cells.
- Oxyntic cells or Parietal cells w ... nach lining secrete hydrochloric acid that lowers the pH of the stomach.
- Zymogenic (chief) cells, which are ... to produce the enzymes pepsin and rennin. (Pepsin digests proteins, and rennin curdles milk).

29.

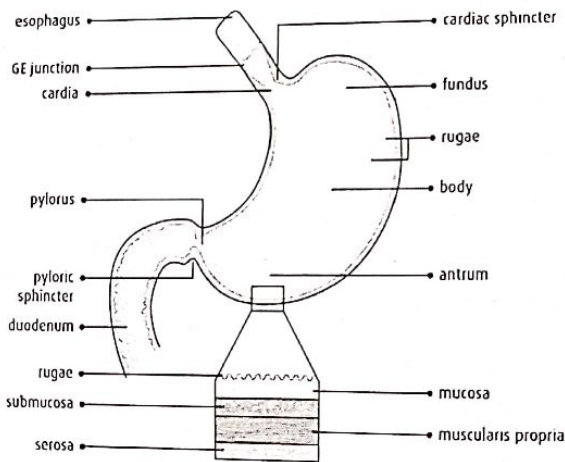


30. The pyloric sphincter is a small piece of smooth visceral muscle that acts as a valve and regulates the flow of partially digested food from the stomach to the duodenum.



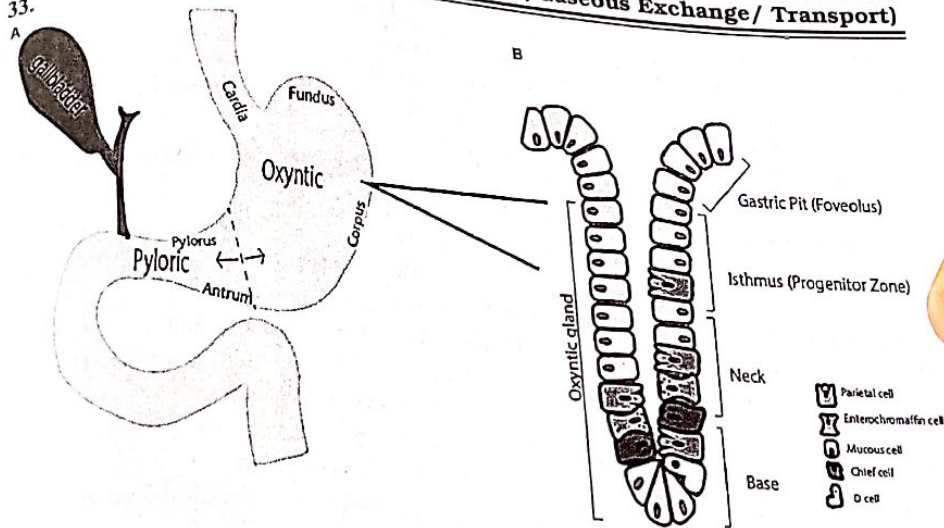
31.

The Stomach

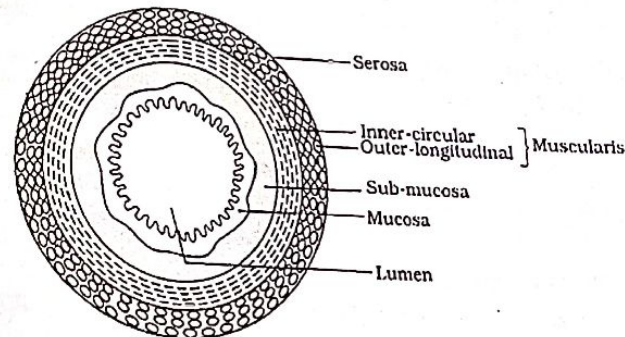


32. Pepsin is a stomach enzyme that serves to digest proteins found in ingested food.

33.



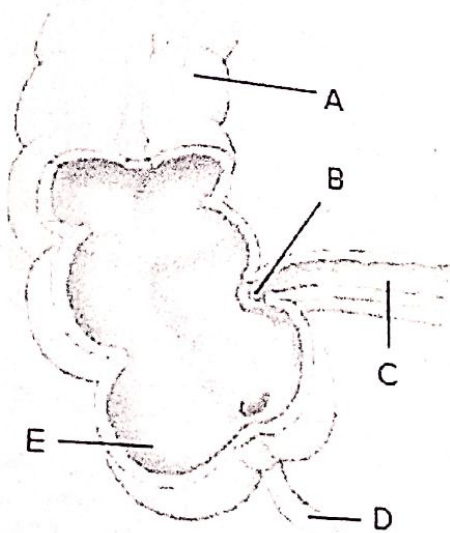
34.



- 35. Lactose is composed of glucose and galactose; lactase is enzyme that breaks lactose.
- 36. Small intestine has duodenum, jejunum and ileum for complete digestion and absorption due to their secretions and large surface area.
- 37. The vein that pours blood from liver to circulatory system is hepatic vein whereas hepatic portal vein pours blood from digestive system to liver.
- 38. In intestine, villi have lacteals which absorb fat and carry lipoprotein as chylomicrons.
- 39. Lipase is an enzyme for lipid digestion which is secreted from pancreas and intestinal lining of small intestine.
- 40. Protein present in lymph combines with fats absorbed from digestive system through lacteals.
- 41. Lacteals are present in villi to absorb and transport fats to the blood in the form of lipoprotein.
- 42. Gastrin and secretin are the hormones which are secreted into the blood and do not pass to large intestine as fecal material.

43. Small intestine has smaller diameter as compared to large intestine.
44. Ptyalin is present in oral cavity for starch digestion.
45. Thoracic lymphatic duct is the main duct which transfers lipoproteins into blood.
46. Amylase and amylpsin are present in buccal cavity and duodenum respectively for starch digestion.
47. Pepsin is present in stomach and works in acidic pH while trypsin is present in intestine and works in alkaline pH.
48. Stomach and duodenum secrete hormones and act as endocrine glands.
49. Secretin is a hormone released into the bloodstream by the duodenum (especially in response to acidity) to control secretion by the liver and pancreas.
50. Enterokinase is an enzyme produced by cells of the duodenum and is involved in digestion in humans and other animal. It converts trypsinogen into its active form trypsin, resulting in the subsequent activation of pancreatic digestive enzymes.
51. Ileum is the 3rd part of small intestine and all types of food components such as monosaccharides, amino acids, fatty acids take place in this section.
52. All secretions have enzymes except bile. It is involved in mechanical digestion of fats which is called emulsification.
53. Pancreas provides a set of enzymes and NaHCO_3 for digestion of carbohydrates, proteins and fats. Liver has no enzymatic secretion.
54. Pancreas has NaHCO_3 which neutralizes the acidic content of food and liver has bile salts for emulsification.
55. When acidic chyme touches the lining of duodenum wall it stimulates the secretion of hormone secretin. It in turn stimulates hepatic and pancreatic secretions and inhibit gastric secretion.
56. Small intestine secretes aminopeptidase enzyme.
57. Pancreas has complete set of enzymes for digestion of all principal components (carbohydrates, proteins and lipids) of food.
58. Liver is a metabolic station and has a lot of enzymes for metabolism.
59. When bile enters the small intestine, it mixes with the fat globules and cause them to break down into smaller units called emulsion droplets. This process is called emulsification. Emulsification greatly increases the surface area of the fat on which the lipase can actually act on.
60. Gall stones are formed in gall bladder. Function of gall bladder is to concentrate bile. One of the components of bile is cholesterol that starts to accumulate in gall bladder. It can lead to gall stones.
61. Large intestine has colon in the form of ascending, transverse, descending and sigmoid colon.
62. Large intestine provides site for absorption of water and electrolytes.
63. Ileocolic sphincter allows materials to pass from ileum to large intestine.

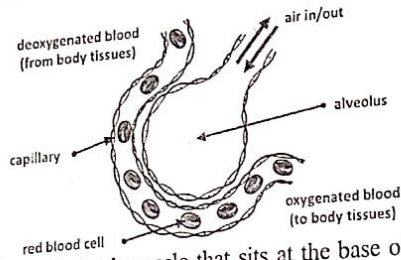
64.



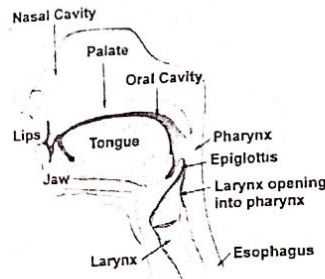
A=Ascending colon, B=ileocecal sphincter, C=ileum, D=appendix, E=caecum.

65. In large intestine vitamin K is formed by the activity of a symbiotic bacterium; *E. coli*.
66. The appendix (vermiform appendix) is a finger-like, blind-ended tube connected to the caecum.
67. Large intestine has 3 parts. i. Caecum, ii. Colon and iii. Rectum.
68. Food poisoning includes diarrhea, abdominal pain and vomiting. As a result there can be severe loss of salts and water in body. To compensate that loss ORS is given.
69. Fat in controlled amount is not hazardous for health but when its level increases in body it can lead to a condition known as obesity.
70. Goblet cells are mucous secreting unicellular structures, present in respiratory system and digestive system except stomach.
71. Ciliated epithelium containing goblet cells is absent in bronchioles.
72. Air while passing through the nasal cavity becomes warm, moist and filtered of smaller foreign particles by mucous membrane.
73. Larynx is also known as voice box and has vocal cords for sound production. It is made up of complex cartilaginous structure surrounding the upper end of the trachea.
74. During swallowing backward movement of tongue pushes the soft palate up and closes the nasal opening at the back.
75. Chamber of the body of vertebrates that is protected by the rib cage is called thoracic cavity.
76. When the diameter of bronchi becomes 1mm or less and it is devoid of cartilage is named as bronchioles.
77. Bronchioles have circular smooth muscles. Cartilage and ciliated epithelium are absent in bronchioles.
78. Air sac is the functional unit of the lungs. Air sac consists of several microscopic single layered structures called alveoli.

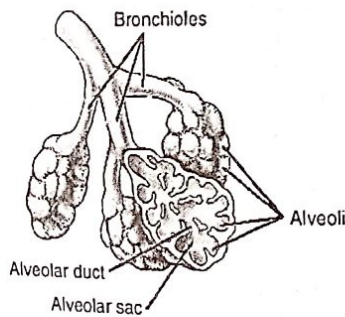
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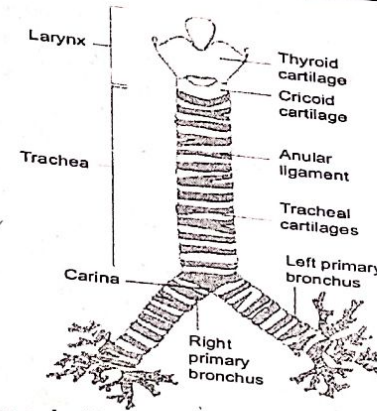
80. The diaphragm is a thin skeletal muscle that sits at the base of the chest and separates the abdomen from the chest. It contracts and flattens when you inhale. This creates a vacuum effect that pulls air into the lungs.
81. Pharynx (throat) is common for digestion and respiration.
- 82.



83. Air while passing through the nasal cavity becomes warm, moist and filtered of smaller foreign particles by mucous membrane.
84. Epithelium of alveoli is squamous or flattened epithelial cells, very thin and irregular in outline, occur as the covering epithelium of the alveoli of the lung.
85. In the glottis, the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.
86. Ventral is the underside of an organism or an organ.
87. In the glottis, the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.
88. Pharynx has three sections: (i) Nasopharynx, (ii) Oropharynx and (iii) Laryngopharynx
- 89.

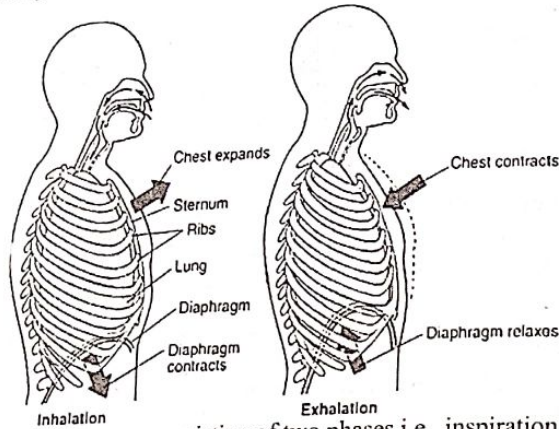


90.

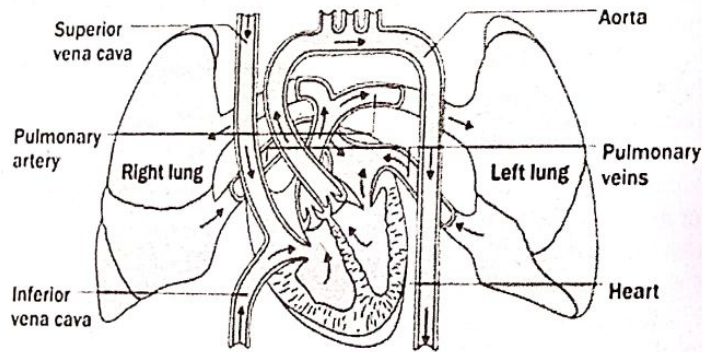


91. In the glottis (upper end of larynx) the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.
92. Air sac is the functional unit of the lungs. Air sac consists of several microscopic single layered structures called alveoli. Gaseous exchange occurs at alveoli.
93. Pharynx is common for digestion and respiration. Air from pharynx moves to trachea and food is pushed to esophagus.
94. When the diameter of bronchi becomes 1 mm or less and it is devoid of cartilage is named as bronchioles.
95. The diaphragm is a thin skeletal muscle that sits at the base of the chest and separates the abdomen from the chest.
96. Goblet cells are unicellular structures which present in respiratory system and secrete mucus.
97. Tiny hairs called cilia protect the nasal passageways and other parts of the respiratory tract, filtering out dust and other particles that enter the nose through the inhaled air.
98. Surfactants are compounds that lower the surface tension (or interfacial tension) between two liquids, between a gas and a liquid, or between a liquid and a solid.
99. Involuntary breathing is controlled by medulla oblongata.
100. Medulla controls breathing in humans. Breathing has two phases. Inspiration is controlled by ventral portion of medulla and expiration is controlled by lateral and dorsal portion of medulla.
101. Surfactant (the mixture of lipoproteins) is produced by the secretory cells of the alveolar epithelium.
102. Surfactants is a lipoprotein layer inside alveoli, which reduce surface tension between water molecules to increase gases exchange.
103. At rest, we inhale and exhale 15-20 times per minute. During exercise, the breathing rate may rise to 30 times per minute.
104. Over all process of breathing is active and consumes energy during inspiration in the form of ATP.
105. Exhaled air has saturated water contents as compared to inhaled air which has variable water contents.
106. Highest concentration in inhaled air and exhaled air is that of N_2 , that is 79%.

107. Oxygen is 21% in inhaled air and it is 16% in exhaled air.
108. Lungs neither pull air in nor can they push it out. During inspiration passive expansion of elastic lungs occurs and expiration is due to passive contraction of lungs.
109. CO₂, O₂, pH and temperature are the factors that affect the capacity of haemoglobin to combine with oxygen.
110. If we hold our breath for long time, then due to increased metabolic activity CO₂ level will increase and pH will decrease.
- 111.

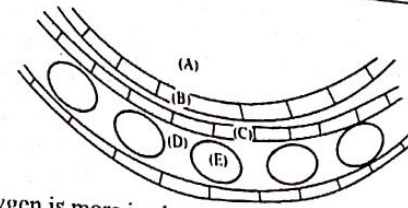


112. Breathing is mechanical process consisting of two phases i.e., inspiration and expiration.
113. Breathing is mechanical process consisting of two phases i.e., inspiration and expiration.
114. Respiratory distress syndrome is common, and it occurs because enough surfactant is not produced by secretory cells of the alveolar epithelium.
115. During inspiration muscles of ribs and diaphragm contract due to which ribs are elevated and diaphragm becomes less dome shaped. The space in chest cavity is increased.
116. Gaseous exchange requires thin surface area for the gases to do diffusion.
117. Carbon dioxide is much more important than oxygen as a regulator of normal alveolar ventilation.
- 118.



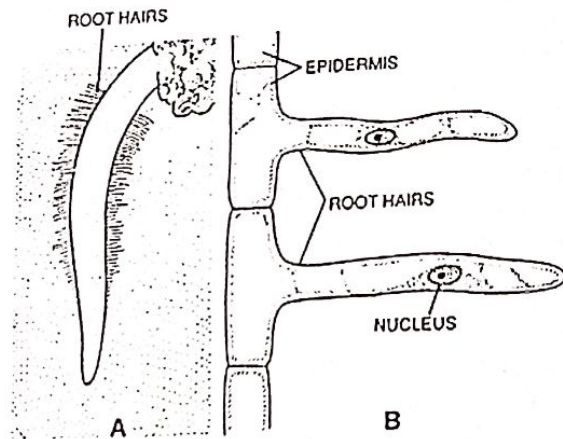
119. The affinity of CO with haemoglobin is more than that of CO₂; similarly, the affinity of CO₂ with haemoglobin is more than O₂.

120.



121. Partial pressure of oxygen is more in alveoli than blood vessels surrounding alveoli.
122. Level of carbon dioxide in the blood is stimulus for breathing. More carbon dioxide in the blood will lead to the carbonic acid formation and so more will be the H⁺ ions concentration. This leads to decrease in oxygen carrying capacity of haemoglobin.
123. Venous blood contains 4% more CO₂ per 100ml (54ml/100ml) of blood as compared to arterial blood (50ml/100ml). However, the case is reverse for pulmonary circulation.
124. Binding site of CO and O₂ with haemoglobin is Fe²⁺ of haem.
125. Carbon dioxide is more soluble in blood than oxygen; about 5 to 7 percent of all carbon dioxide is dissolved in the plasma.
126. When oxygen tension is 115 mmHg mercury, haemoglobin is 98% saturated and therefore contains 19.6 ml of oxygen per 100ml of blood.
127. 70% of carbon dioxide is transported in the form of NaHCO₃. CO₂ combines with amine group of haemoglobin.
128. During cellular respiration, oxygen is used and carbon dioxide is produced, due to the consumption of oxygen there is least partial pressure of oxygen at tissue level.
129. Approximately there is 20% oxygen in the air (20ml/100ml or 200ml/1000ml).
130. More CO₂, less O₂, high temperature and less pH facilitate oxygen dissociation from oxyhaemoglobin.
131. Addition of H⁺ ions or electrons is known as reduction. Reduced form of haemoglobin contains H⁺.
132. 90% of cytoplasm of erythrocytes is occupied by haemoglobin. Each molecule of haemoglobin carries four oxygen molecules.
133. About 70% of CO₂ is transported as bicarbonate ions.
134. About 70% CO₂ is transported in the form of bicarbonate ions and about 20% is transported as carboxyhaemoglobin. Carboxyhaemoglobin is formed when carbon dioxide combines with amine group of haemoglobin.
135. More CO₂, less O₂, high temperature and less pH facilitate oxygen dissociation from oxyhaemoglobin.
136. Gaseous exchange is always a passive process in which gases move from higher concentration to lower concentration.
137. Tidal volume is the amount of air that moves in or out of the lungs with each respiratory cycle. It measures around 500 mL in an average healthy adult.
138. Residual volume is the volume of air remaining in the lungs after maximum forceful expiration. Its value is between 1400 and 1600 ml.
139. The amount of extra air inhaled (above tidal volume) during a deep breath is inspiratory reserve volume. 6000 ml is the total lung capacity.
140. Haemoglobin has four polypeptide chains; each chain has one haem group which can bind with single oxygen molecule.

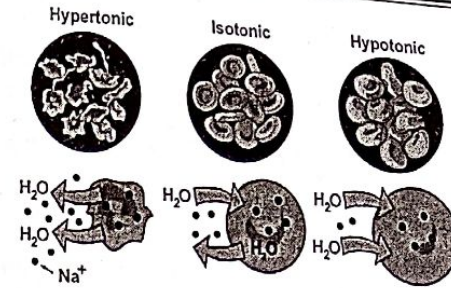
141. Without hemoglobin transport of oxygen in blood would be greatly reduced as one molecule of Hb can bind four molecules of oxygen at a time.
142. The actual colour of RBCs is red and it is due to the presence of iron in the haem group of haemoglobin.
143. Haemoglobin has four polypeptide chains and each one contains a haem group.
144. Myoglobin stores oxygen in muscles. It is also known as muscle haemoglobin. It has a more affinity for oxygen as compared to haemoglobin, so for this reason it is not a good oxygen carrier.
145. Rickets is the softening and weakening of bones in children, usually because of an extreme and prolonged vitamin D deficiency.
146. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.
147. Malnutrition and poor living conditions facilitate *Mycobacterium* to grow.
148. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.
149. Active transport is the uphill movement of material by using energy in the form of ATP, which is synthesized by the process of cellular respiration.
150. A root hair or the rhizoid of a vascular are extensions of epidermal cells of root. As they are lateral extensions of a single cell and only rarely branched, they are visible to the naked eye and developed in maturation region of roots.
- 151.



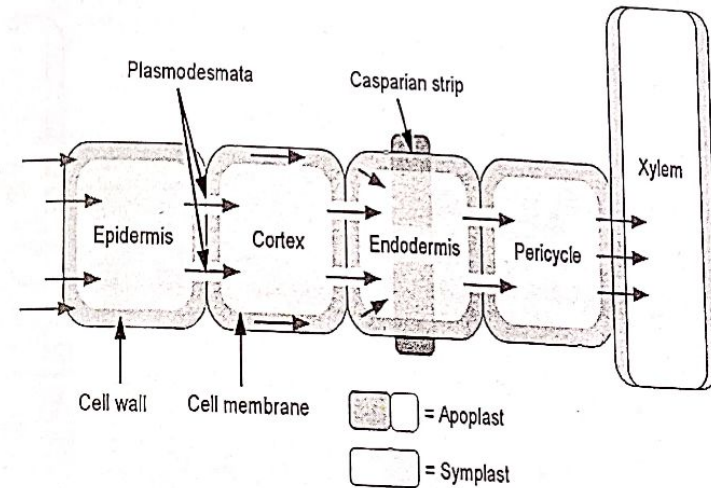
Root hair. A, young seedling of radish with root hairs developing acropotally; B, highly magnified mature root hairs with vacuolated cytoplasm.

152. Facilitated diffusion is the transport of substances across a biological membrane from an area of higher concentration to an area of lower concentration with the help of a transport protein.
153. When a cell is placed in distilled water, it starts to gain turgidity as water enters the cell and it swells.

154.

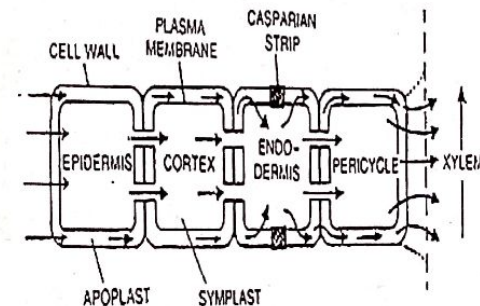


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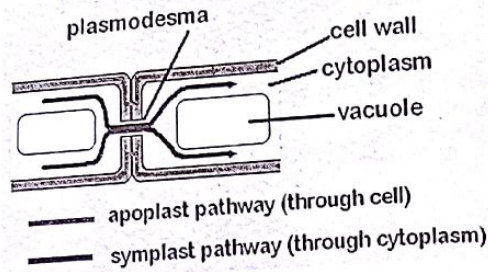


156. A vacuole is a membrane-bound organelle (tonoplast). They are a kind of vesicle. Vacuoles are closed sacs, made of membranes with inorganic or organic molecules inside, such as enzymes. Protoplast is cell without cell wall. Cisternae are the structure present in endoplasmic reticulum, while cristae are the inholdings of inner mitochondrial membrane.

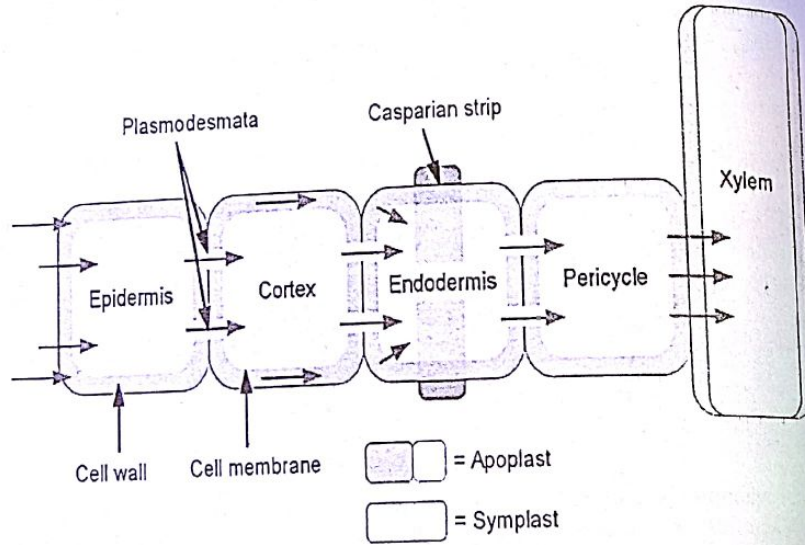
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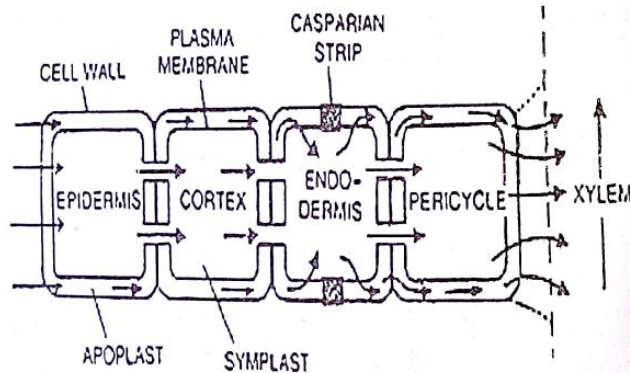
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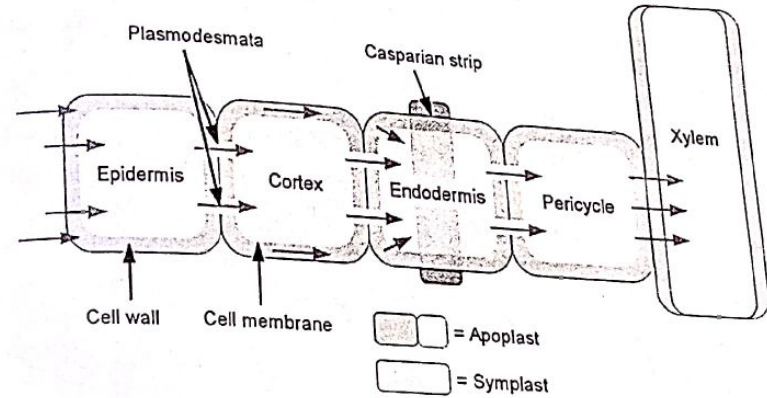
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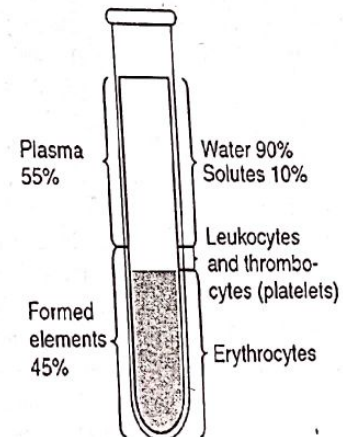
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161.

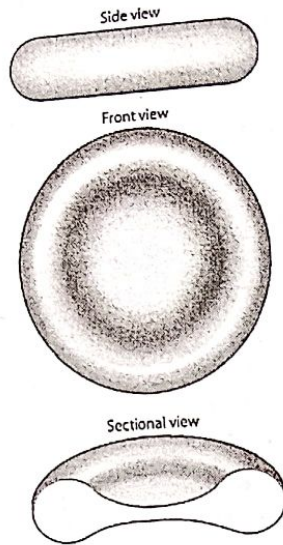


162. Hydrogen bonding between water molecules is a vital force and this helps in transportation of material in plants. This is strongly supported by a theory known as Ascent of Sap.
163. Rate of transpiration is directly proportional to light, temperature and wind, while it is inversely proportional to humidity in air.
164. Sucrose is transported by phloem. In plants material movement is between source (Leaves) to sink (Area of metabolism or storage such as growing tips etc.)
165. Well accepted theory that explains transport of organic solutes in plants is pressure flow theory while force of diffusion cannot elaborate it. Imbibition and ascent of sap explain transport of water in xylem.
166. When sucrose is loaded from companion cells to sieve tube cell, this is accompanied by usage of ATP. Use of ATP to perform a process in living cell is known as active transport.
- 167.



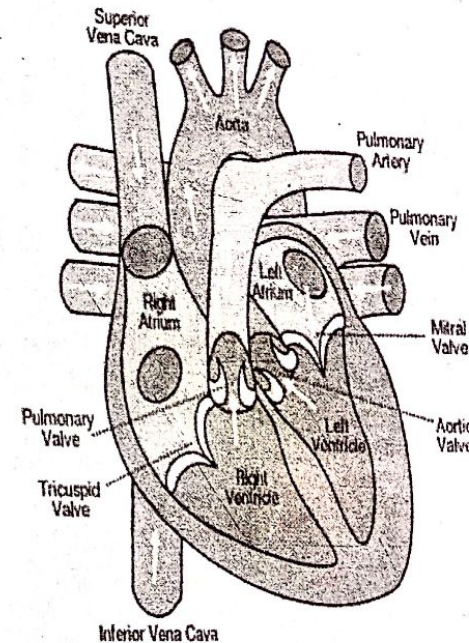
168. RBCs have no role in immunity.

169.



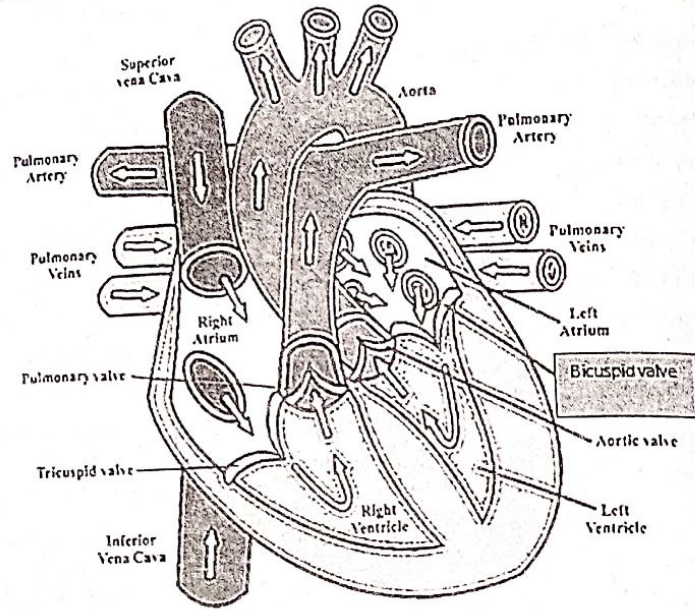
170. Lymphocytes are white blood cells that are also one of the body's main types of immune cells. They are made in the bone marrow and found in the blood and lymph tissue. The immune system is a complex network of cells known as immune cells that include lymphocytes.
171. B cells differentiate into plasma cells that produce antibody molecules closely modeled after the receptors of the precursor B cell. Once released into the blood and lymph, these antibody molecules bind to the target antigen (foreign substance) and initiate its neutralization or destruction.
172. Average life-span of RBCs is about 120 days or 4 months, and after that they will be destroyed mainly in spleen.
173. These flaps are attached with fibrous cords called chordae tendinae, to the papillary muscles which are extensions of the wall of the ventricles.
174. The wall of left ventricle is thicker (3 times) than that of right ventricle.
175. The nature of valves present in the heart is muscular and muscles ensure the unidirectional flow of blood in circulation.
176. The right ventricle pumps deoxygenated blood into the pulmonary circulation for oxygenation and the left ventricle pumps oxygenated blood into the systemic circulation through aorta.
177. Mitral valve is another name used for bicuspid valve and prevents the entry of blood from
178. At the base of aorta, first pair of arteries, the coronary arteries arise and supply blood to heart.
179. When ventricle contraction start, atrio-ventricular valve close to prevent back flow of blood and semilunar valve open to move blood out form heart.
180. On ventricular contraction blood from right ventricle is pumped into pulmonary trunk and from left ventricle blood is pumped into aorta. To prevent backflow of blood into ventricles there are semilunar valves at the base of aorta and pulmonary trunk.
181. Myocardium of heart has striations which show similarity with skeletal muscles but cardiac muscles are involuntary in action.

182. In humans, only left systemic arch is present while in birds only right systemic arch is present.
183. First artery that arises from base of aorta is coronary artery which supplies oxygenated blood to the heart.
184. Descending aorta is bifurcated into two iliac arteries which on further division form femoral artery that supplies blood to thigh muscles of legs.
185. The pulmonary vein carries oxygenated blood from the lungs to the left atrium.
186. The hepatic portal vein is a vessel that moves blood from the spleen and gastrointestinal tract to the liver. It is approximately three to four inches in length and is usually formed by the merging of the superior mesenteric and splenic veins behind the upper edge of the head of the pancreas.
187. The pulmonary vein carries oxygenated blood from the lungs to the left atrium.
- 188.



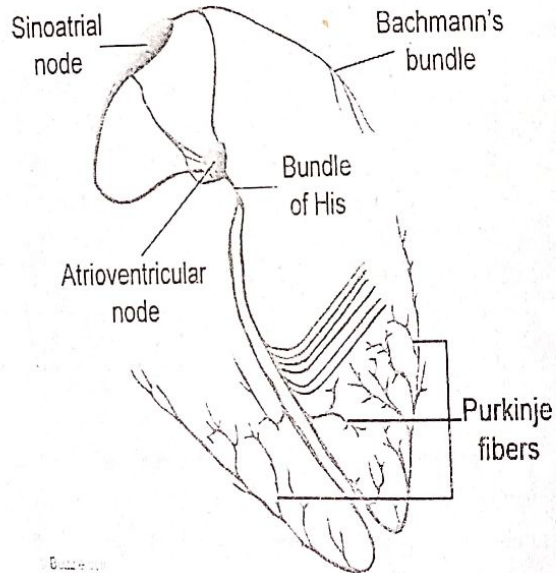
189. The flaps of heart valves are attached with fibrous cords called chordae tendinae, to the papillary muscles which are extensions of the wall of the ventricles.
190. The heart is enclosed in a double membranous sac – the pericardial cavity, which contains the pericardial fluid.
191. These flaps of heart valves are attached with fibrous cords called chordae tendinae, to the papillary muscles which are extensions of the wall of the ventricles.

192.



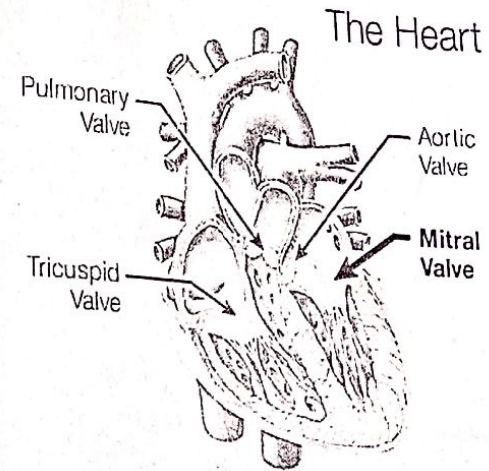
193. The wall of left ventricle is thicker (3 times) than that of right ventricle.

194.

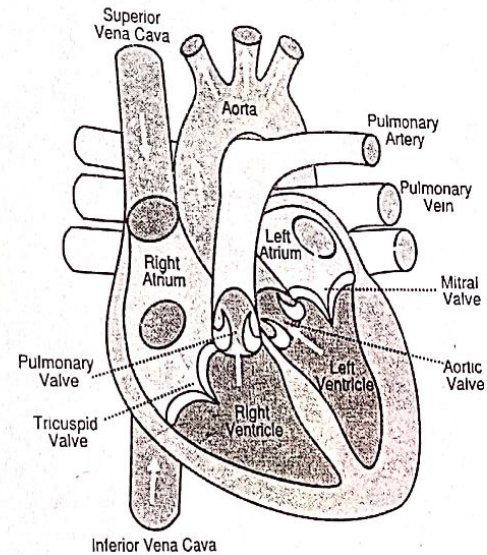


195. The chordae tendinae (tendinous cords), colloquially known as the heart strings, are tendon-resembling fibrous cords of connective tissue that connect the papillary muscles to the tricuspid valve and the mitral valve in the heart.

196.



197.

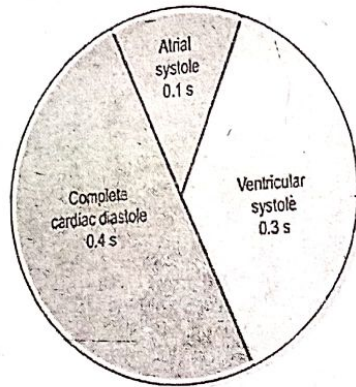


198. During atrial systole, the atrio-ventricular valves remain open while semi-lunar valves remain close because the pressure gradient between the atrium and ventricle is preserved during late ventricular diastole.

199. At the end of ventricular systole, atrio-ventricular and semilunar valves close.

200. In healthy adults, there are two normal heart sounds, often described as a lubb and a dubb, that occur in sequence with each heartbeat. These are the first heart sound (S₁) and second heart sound (S₂), produced by the closing of the atrio-ventricular valves and semilunar valves, respectively.

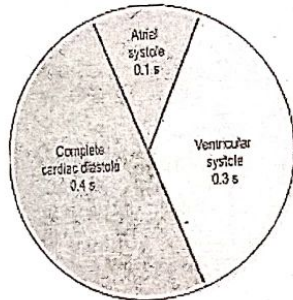
201.



Total period of 1 cycle = 0.8 s

202. During ventricle contraction two heart sounds produce, 1st sound is "Lubb" produced when AV-valves close while the 2nd heart sound is "Dubb" which is produced when semilunar valves close.

203.



Total period of 1 cycle = 0.8 s

204. During atrial systole following events occur:

- AV valves open
- SL valves close
- Muscles of atria contract and pump blood to ventricles
- Ventricles are relaxed and receive blood from atria.

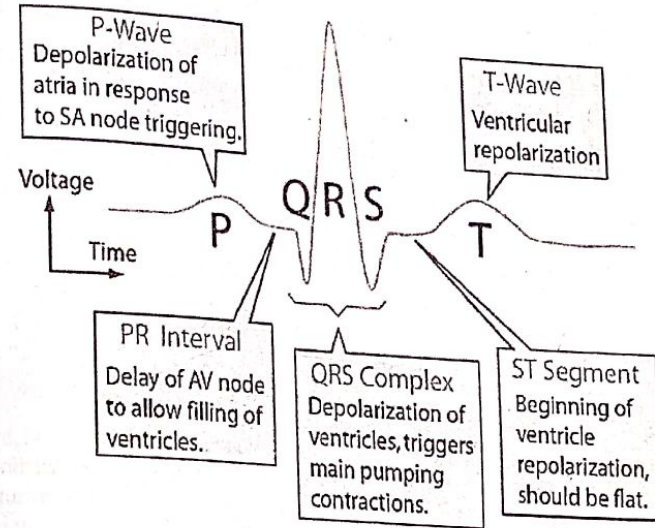
205. The SA node is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium.

206. The atrioventricular node or AV node is a part of the electrical conduction system of the heart that coordinates the top of the heart. It electrically connects the atria and ventricles.

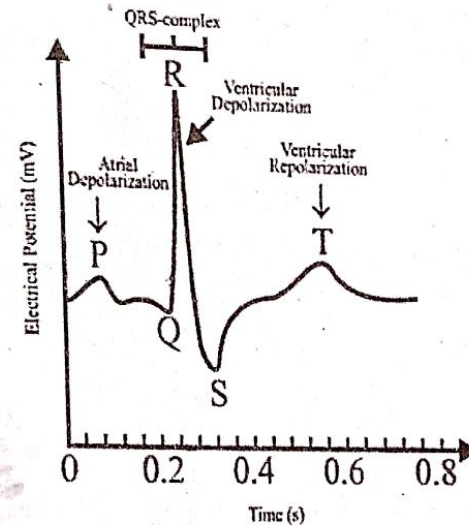
207. The SA node is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium.

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209.



210.



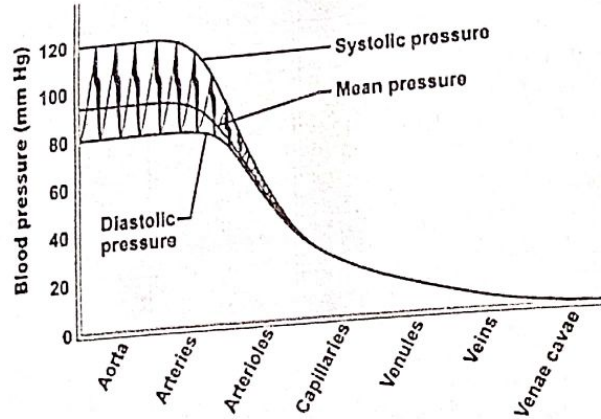
211. ECG is a test to check electrical events of heart that is determined by the electrodes placing on body.

212. Arteriosclerosis is a degenerative disorder which is the result of continuous process based on degenerative cellular changes affecting tissues or organs, and will increasingly deteriorate over time.

213. Pulmonary vein carries oxygenated blood from lungs to left atrium of heart.

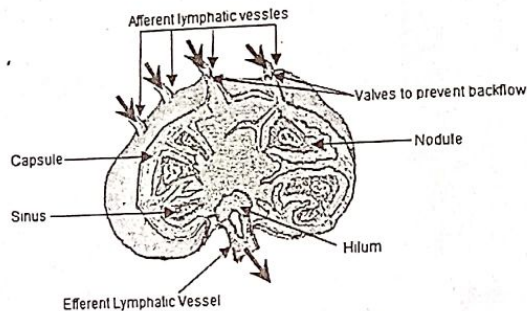
214. Semilunar valves are present in veins to prevent back flow of blood.

215.



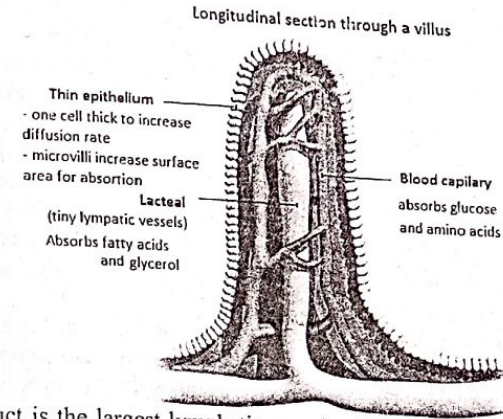
216. Transportation of absorbed lipids from small intestine, filtration of blood by spleen and immunity is related to the lymphatic system while filtration of urea is the function of kidneys.
217. Lymph is extra cellular fluid present in lymph vessels. Subclavian vein is a part of blood circulatory system.
218. The lymph is formed when the interstitial fluid (the fluid which lies in the interstices of all body tissues) is collected through lymph capillaries.
- 219.

Lymph Node Structure

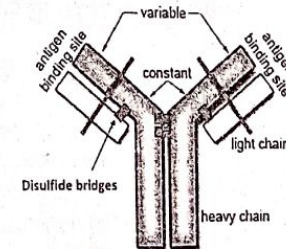


220. The largest lymphoid structure present in the human body is spleen while thymus, adenoid and tonsils are relatively small structures.
221. Lymph flow from body parts is assisted by the movement of viscera, breathing movement and skeletal muscles.
222. Lymph nodes are important for the proper functioning of the immune system, acting as filters for foreign particles and cancer cells. Lymph nodes do not have a detoxification function, which is primarily dealt by liver.
223. The thoracic duct is the largest lymphatic vessel within the human body. Lymph before entering into the blood passes through lymphatic duct.
224. Lymph movement is controlled by the contraction of skeletal muscles, the calf muscles are skeletal muscles in lower limbs that will assist the movement of lymph.

225. After some fatty meal fat globules forms 1% of lymph that returns to blood.
226. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left subclavian vein through thoracic duct.
- 227.

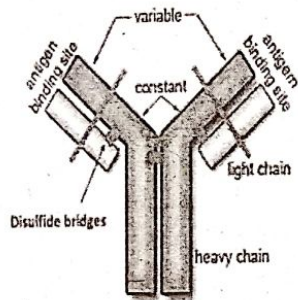


228. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left sub-clavian vein through thoracic duct.
229. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left sub-clavian vein through thoracic duct.
230. Recognition of antigen is important in both types of responses. However, tissue rejection is a cell mediated response, on the other hand production of antibodies and plasma clone formation is achieved by cell humoral response.
231. Tetanus vaccine, also known as tetanus toxoid, is an inactive vaccine used to prevent tetanus. It is considered as artificial active immunity.
232. Passive immunity can occur naturally, when maternal antibodies are transferred to the fetus through the placenta and it can also be induced artificially, when high levels of antibodies specific to a pathogen or toxin (obtained from humans, horses, or other animals) are injected to affected person.
233. Two light and two heavy chains are visible in given diagram.



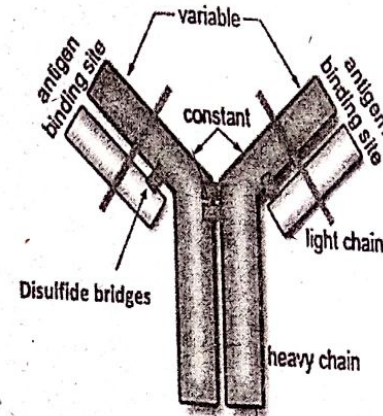
234. An antibody (Ab), also known as an immunoglobulin (Ig), is a large, Y-shaped globular protein produced mainly by plasma cells that is used by the immune system to phagocytose the antigens or neutralize their toxins.
235. As we can see antigen binding sites are present on variable region of both heavy and light chains

236. Antigen is a toxin or other foreign substance which induces an immune response in the body, especially the production of antibodies.
237. Hemoglobin mobilization is the function of blood and heart that comes under circulatory system.
238. HIV is dangerous because the virus destroys the cells of immune system. HIV replicates within helper T lymphocytes and destroys them.
239. Specific immunity is the result of 3rd line of defense which includes lymphocytes.
240. Phagocytes are type of cells within the body capable of engulfing and absorbing bacteria and other small cells or particles. These are neutrophils and monocytes that form 2nd line of defense.
241. Skin, HCl and mucous are examples of barriers which constitute 1st line of defense while antibodies produced by lymphocytes which belong to 3rd line of defense.
242. Cyclosporine is used to prevent organ rejection (cell mediated) in people who have received a liver, kidney, or heart transplant. It is usually taken along with other medications to allow your new organ to function normally. Cyclosporine belongs to a class of drugs known as immuno-suppressants.
243. The innate immunity, also known as the non-specific immunity or in-born immunity, is an important subsystem of the overall immune system that comprises the cells and mechanisms that defend the host from infection by other organisms.
244. In passive immunization we inject antibodies in the body; body does not make its own antibodies.
- 245.

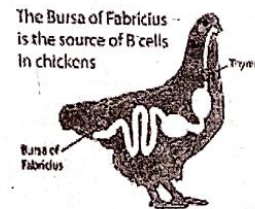


246. Vaccines have been prepared against different types of bacterial and viral infections, but there is no vaccine against fungus yet.
247. For immunity purpose antibodies or immunoglobulin are produced by all vertebrates which protect them against pathogens.
248. Any foreign substance which induces an immune response in the body of organism especially by producing antibodies is called antigen.
249. is used to prepare vaccine that may be weakened or killed. It will provide active acquired immunity against a particular disease.
250. In humoral immune response B-lymphocytes proliferate and form plasma clone cell and memory cells. Plasma clone cells produce antibodies which phagocytose an antigen or neutralize toxins produced by pathogens.
251. B-lymphocytes are cells of immune system that produced from bone marrow in human but in case of birds they are originated from Bursa of Fabricius which is a lymphoid mass.

252.

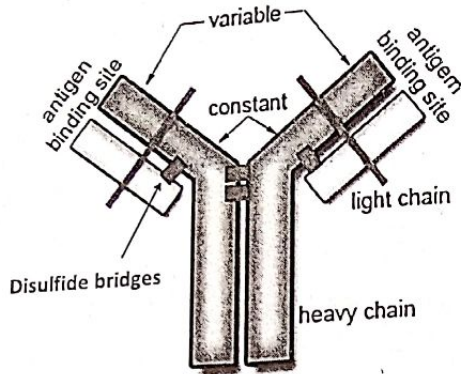


253. The thymus is a specialized primary lymphoid organ of the immune system. Within the thymus, lymphocytes or T cells mature. T cells are critical to the adaptive immune system, where the body adapts specifically to foreign invaders.
254. Antibodies are formed by four polypeptide chains (Two heavy and two light chains).
255. The humoral immune system deals with antigens from pathogens that are freely circulating, or outside the infected cells. Cellular immunity occurs inside infected cells and is mediated by T lymphocytes.
256. Two types of immunity exist — active and passive: Active immunity occurs when our own immune system is responsible for protecting us from a pathogen. Passive immunity occurs when we are protected from a pathogen by immunity gained from someone else.
257. Antibodies are produced by plasma cells of B-lymphocytes.
- 258.

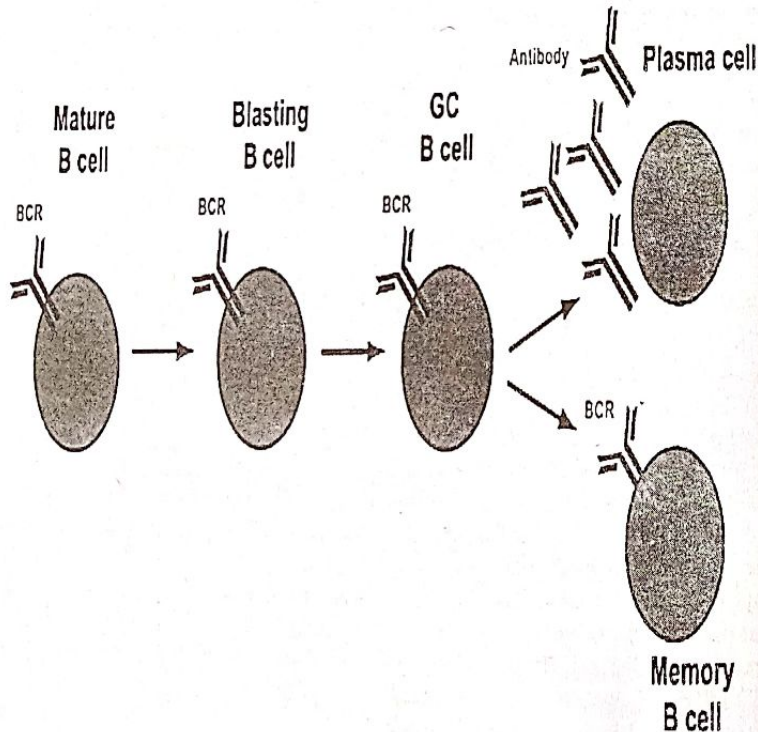


259. Humoral immunity is the aspect of immunity that is mediated by macromolecules found in extracellular fluids such as secreted antibodies, complement proteins, and certain antimicrobial peptides. Humoral immunity is named so because it involves substances found in the humors, or body fluids.
260. Transplant rejection is caused primarily by a cell-mediated immune response to HLA antigens expressed on donor antigen-presenting cells (APCs) transferred along with the transplanted organ. Recognition of donor HLA antigens on the cells of the graft induces vigorous T cell proliferation in the recipient.
261. Tetanus is a bacterial infection, which can be treated by anti-tetanus serum.

262.

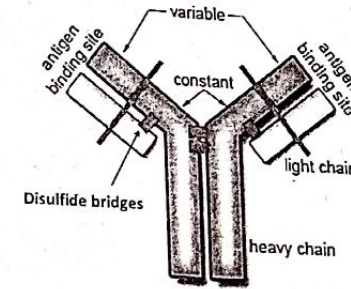


263. Passive immunity is given from mother to child through the placenta before birth, and through breast milk after birth. It can also be given medically through blood products that contain antibodies, such as immune globulin. This type of immunity is fast acting but lasts only a few weeks or months.
264. The passive rabies immunization is commonly used after a certain type of wild animal bites and accident etc.
- 265.



266.
267.

Active immunity is always antigen based while passive immunization is antibodies based.



268. Cell-mediated immunity is an immune response that does not involve antibodies. Rather, cell-mediated immunity is the activation of phagocytes, antigen-specific cytotoxic T-lymphocytes, and the release of various cytokines in response to an antigen.
269. Anti-venom, also known as antivenin, venom antiserum, and anti-venom immunoglobulin, is a specific treatment for envenomation. It is composed of antibodies and used to treat certain venomous bites and stings. Anti-venoms are recommended only if there is significant toxicity or a high risk of toxicity.
270. A substance used to stimulate the production of antibodies and provide immunity against one or several diseases, prepared from the causative agent of a disease, its products, or a synthetic substitute, treated to act as an antigen without inducing the disease.
271. Naturally acquired active immunity occurs when the person is exposed to a live pathogen, develops the disease, and becomes immune as a result of the primary immune response. Artificially acquired active immunity can be induced by a vaccine, a substance that contains the antigen.
272. Gene therapy is use for genetic problem's treatment. Drugs are used for infectious diseases. Antibodies used for passive immunization.
273. An antibiotic is a type of antimicrobial substance active against bacteria. Transposon, class of genetic elements that can "jump" to different locations within a genome.
274. An autoimmune disease is a condition in which your immune system mistakenly attacks your body. The immune system normally guards against germs like bacteria and viruses. When it senses these foreign invaders, it sends out an army of fighter cells to attack them.

Shape and Size of Bacteria

- Q.1 Largest number of bacteria may be found in the arrangement called as:
A. Streptococci B. Sarcina
C. Tetrad D. Diplococci
- Q.2 *Vibrio cholera* belongs to which category?
A. Coccus B. Diplococcus
C. Bacillus D. Spirochete
- Q.3 Syphilis is caused by a:
A. Spirochete B. Water blooms (MDCAT 2016)
C. *Nostoc* D. Cyanobacteria
- Q.4 In which of the following shapes, gut living symbiont *Escherichia coli* is found?
(MDCAT 2017)
A. Round B. Spiral
C. Oval D. Rod
- Q.5 Arrangement of coccus bacteria in chain is called:
(MDCAT 2017)
A. Streptococci B. Tetrad
C. Staphylococci D. Sarcina
- Q.6 Rod-shaped bacteria are known as _____.
(MDCAT 2018)
A. Bacilli B. *Vibrio*
C. Cocci D. Sarcina
- Q.7 When the division of cell is in two planes it will produce an arrangement having _____ cocci:
A. 2 B. 4
C. 8 D. 1
- Q.8 Largest bacteria among followings:
A. *Acanthorus nigrofuscus* B. *Epulopiscium fishelsoni*
C. *Bacillus subtilis* D. *Spirochaeta plicatilis*
- Q.9 Bacteria that are pleomorphic:
A. *Helicobacter pylori* B. *Epulopiscium fishelsoni*
C. *Bacillus subtilis* D. *Spirochaeta plicatilis*

Bacterial Cell Structures (Cell Envelope)

- Q.10 Primary stain used in gram staining is:
A. Crystal violet B. Alcohol
C. Safranin D. Iodine
- Q.11 Archaeobacteria lack in their structure/composition:
A. Cell wall B. Glycoprotein
C. Plasma membrane D. Peptidoglycan
- Q.12 Glycocalyx is made up of:
A. Lipopolysaccharides B. Polysaccharides
C. Lipoproteins D. Peptidoglycan

- Q.13 In Gram negative bacteria, the outer membrane is made up of:
A. Lipopolysaccharides B. Polysaccharides
C. Lipoproteins D. Peptidoglycan
- Q.14 All are the characteristics of Gram positive bacteria except:
A. High content of peptidoglycan B. High permeability
C. Teichoic acid is present D. Stain pink with primary dye
- Q.15 Cell envelope of a bacterium does not include:
A. Capsule B. Cell wall
C. Slime D. Plasma membrane
- Q.16 Some bacteria are resistant to phagocytosis due to the presence of:
A. Cell wall B. Capsule
C. Flagella D. Slime
- Q.17 Peptidoglycan or murein is a special or distinctive feature of cell wall in:
A. Algae B. Bacteria (MDCAT 2014)
C. Fungi D. Plants
- Q.18 Cell wall structure of a cell of unknown origin was studied and was found to contain polysaccharide chain linked with short chains of amino acid. What do you think it can be?
(MDCAT 2017)
A. Bacteria B. Algae
C. Fungi Cell D. Cortex cells
- Q.19 Find the characteristic true for Gram positive bacteria.
(MDCAT 2017)
A. Periplasmic space present in all B. Two major layers
C. Less lipids than Gram-ve D. Outer membrane present
- Q.20 If lipopolysaccharides did not appear in the wall of bacteria on staining, then it will be known as _____.
(MDCAT 2018)
A. Gram positive B. Gram negative
C. Gram positive & gram negative D. Capsule

Bacterial Cell Structures (Cell membrane onwards)

- Q.21 Respiratory enzymes in bacteria are present in/at:
A. Mesosomes B. Cell wall
C. Nucleoid D. Cytoplasm
- Q.22 Dormant thick walled desiccation resistant body:
A. Endospore B. Mesosomes
C. Exospore D. Cyst
- Q.23 Member of Kingdom Monera devoid of cell wall is:
A. Actinomycets B. Eubacteria
C. *Mycoplasma* D. Archaeobacteria
- Q.24 Bacterial plasma membrane is not involved in:
A. Maintenance of cell shape B. Cell Division
C. DNA replication D. Respiratory metabolism
- Q.25 Bacterial membranes differ from eukaryotic membrane as they lack:
A. Peptidoglycan B. Lipids
C. Phospholipid D. Cholesterol

- Q.26 What is not true about bacterial spore?
 A. Produced during differentiation of vegetative cells
 B. Are heat resistant
 C. Are desiccation resistant
 D. May be exospores or endospores
- Q.27 Many bacteria are motile due to presence of:
 A. Flagella
 B. Cilia
 C. Pilli
 D. Microtubules (MDCAT 2016)
- Q.28 Nucleoid is a structure not found in:
 A. *Campylobacter*
 B. Spirochete
 C. Cyanobacteria
 D. Goblet cells (MDCAT 2017)
- Q.29 _____ is an invagination of cell membrane which helps in cell division.
 A. Fimbriae
 B. Mesosome
 C. Nucleoid
 D. Endospore (MDCAT 2016)
- Q.30 Students were asked to give a guess about a unicellular organism with darkly stained nucleus. Which of the following can be straight away excluded from the list?
 A. *Paramecium*
 B. *Plasmodium*
 C. *Amoeba*
 D. *Lactobacillus* (MDCAT 2017)
- Q.31 DNA of bacteria is present in:
 A. Nucleoid
 B. Mitochondria
 C. Nucleus
 D. Mesosome (MDCAT 2017)
- Q.32 If one of the following components is missing, bacteria cannot increase the number of its plasmid copies?
 A. Antibiotic resistant gene
 B. Origin of replication
 C. Cloning site
 D. Ligases Enzymes (ETEA 2017)
- Q.33 When tuft of the flagella is present at both the ends in the structure of bacterial cell, then the condition is called:
 A. Atrichous
 B. Peritrichous
 C. Lophotrichous
 D. Amphitrichous (NTS 2018)
- Q.34 Which of the following divide by fission?
 A. Viruses
 B. Viroids
 C. Fungus
 D. Bacteria
- Q.35 A bacterium which has a group of two or more flagella inserted at one pole of the cell:
 A. Monotrichous
 B. Peritrichous
 C. Lophotrichous
 D. Amphitrichous- (ETEA 2019)
- Q.36 The following are sexual reproduction methods in bacteria, except:
 A. Transformation
 B. Transduction
 C. Binary fission
 D. Conjugation (ETEA 2019)
- Q.37 Which of the following is true about the structure of a typical bacterium?
 A. It has cell wall
 B. It has genetic material
 C. It has cytoplasm
 D. All of the above (PMC 2020)

- Q.38 It is not true about archaea:
 A. Inhibited by antibiotics
 B. Introns are present in some genes
 C. Peptidoglycan is absent in cell wall
 D. Branched carbon chains in membrane lipids
- Q.39 A similarity that can be present between flagella of bacteria and an animal cell:
 A. Motility as function
 B. Type of protein
 C. Length
 D. Number
- Q.40 Chances of _____ having a flagella are rare.
 A. *Hyphomicrobium*
 B. *Escherichia*
 C. *Bacillus*
 D. *Diplococcus*
- Q.41 What is false statement about pili?
 A. It is made up of pilin protein
 B. True pili present in gram positive and negative bacteria
 C. Crucial for conjugation
 D. Means of attachment
- Importance and Control of Bacteria**
- Q.42 Bacteria that live in intestine and produce vitamin 'K' belongs to:
 A. Coccus
 B. Spirilla
 C. Bacillus
 D. Spirochetes
- Q.43 Resistance against antibiotics is mainly increasing because of:
 A. Misuse of antibiotics
 B. Greenhouse effect
 C. Global warming
 D. Allergies
- Q.44 Chemotherapeutic agent is/are:
 A. Antibiotics
 B. Disinfectants
 C. Vaccines
 D. Both A & B
- Q.45 Bacteria present in canned foods are:
 A. *Clostridium botulinum*
 B. *Campylobacter jejuni*
 C. *Salmonella typhi*
 D. *Streptococcus pneumoniae*
- Q.46 Antibiotics and hormones can be sterilized by using:
 A. Membrane filtration
 B. Radiations
 C. Dry heat
 D. Moist heat
- Q.47 What is true about antibiotics?
 A. Always protein in nature
 B. Never cause side effects
 C. Always produced from living cells
 D. Can also be synthesized in laboratory
- Q.48 Treatment by using attenuated culture of bacteria is called _____.
 A. Chemotherapy
 B. Antisepsis
 C. Sterilization
 D. Vaccination (MDCAT 2014)
- Q.49 Which one of the following antibiotic causes permanent discoloration of teeth in young children if it is misused?
 A. Penicillin
 B. Sulfonamide
 C. Streptomycin
 D. Tetracycline (MDCAT 2014)

- Q.50 Antibiotics interfere with some aspect of growth or metabolism of the target organism (KMDC 2014) such as:
 A. Synthesis of bacterial walls
 C. Protein synthesis
 E. All
- Q.51 Select the method which causes the oxidation of chemical constituents of a bacterial cell: (PMC 2020)
 A. Steam
 C. Dry heat
- Q.52 Which of the followings can have microbicidal effect?
 A. Alcohol
 C. Antibiotics
- Q.53 _____ are in general used for sterilization process.
 A. X-rays
 C. Beta rays
- Q.54 All of the followings can be sterilized by membrane filters except:
 A. Antibiotics
 C. Hormones

- B. Plasma membrane function
 D. Enzyme action
- B. Filtration
 D. Radiation
- B. Formaldehyde
 D. All A, B, C
- B. Ultrasounds
 D. Gamma rays
- B. Seras
 D. Flasks

ANSWER KEY

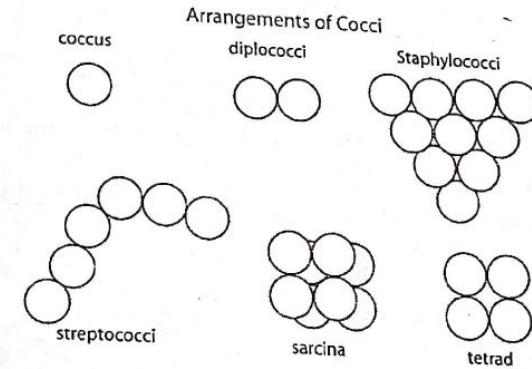
TOPIC-WISE MCQS & PAST PAPER MCQS

1	A	11	D	21	A	31	A	41	B	51	C
2	D	12	B	22	D	32	B	42	C	52	D
3	A	13	C	23	C	33	D	43	A	53	D
4	D	14	D	24	A	34	D	44	A	54	D
5	A	15	D	25	D	35	C	45	A		
6	A	16	D	26	A	36	C	46	A		
7	B	17	B	27	A	37	D	47	D		
8	B	18	A	28	D	38	A	48	D		
9	A	19	C	29	B	39	A	49	D		
10	A	20	A	30	D	40	D	50	E		

EXPLANATORY NOTES

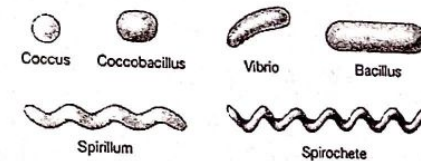
TOPIC-WISE MCQS & PAST PAPER MCQS

1.

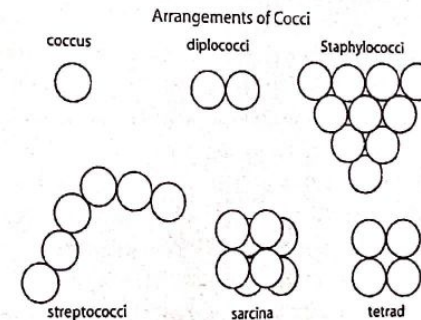


2. Coccus and diplococcus are round in shape while *Vibrio cholera* is spirochete.
3. Syphilis is an infection caused by the bacteria *Treponema pallidum* (Spirochete). Syphilis is spread by direct contact with an infected individual, such as: Sexual contact.
4. *Escherichia coli* is a member of the family *Enterobacteriaceae*, which includes gram-negative, facultative anaerobic rod-shaped bacteria.
5. Pairs of cocci are called diplococci; rows or chains of such cells are called streptococci; grapelike clusters of cells, staphylococci; packets of eight or more cells, sarcina; and groups of four cells in a square arrangement, tetrads.

6.

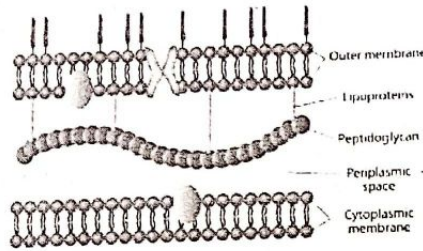


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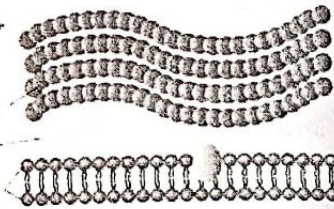


8. The largest bacteria *Epulopiscium fishelsoni* was discovered in brown surgeon fish *Acanthurus nigrofuscus*. It is 80 μm in thickness while its length is about 600 μm .
9. Both *Epulopiscium* and *Bacillus* are rod shaped bacteria while *Spirochaeta* are spiral shaped. Pleomorphic bacteria have no fixed shape and *Helicobacter* comes under this category.
10. The primary stain used in Gram staining is crystal violet while safranin is the secondary stain.
11. Cell walls of Archaeobacteria are composed of different polysaccharides and proteins, with no peptidoglycan.
12. Glycocalyx is an outer coating that covers the outside of bacterial cell wall. It exists in two forms; slime and capsule. This glycocalyx is generally made up of polysaccharides.
13. Gram positive bacteria has no outer membrane but gram negative bacteria has one and that outer membrane is formed of lipoproteins.

GRAM-NEGATIVE

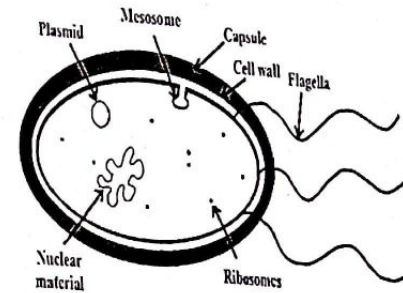


GRAM-POSITIVE



14. Gram positive bacteria show purple colour when stained with primary dye (crystal violet), while gram negative bacteria show purple colour due to safranin.
15. Capsule, slime and cell wall are included in the cell envelope of bacteria while cell membrane is not included.
16. Slime is involved in pathogenicity that is why resistant to phagocytosis.
17. The cell wall is the principal stress-bearing and shape-maintaining element in bacteria formed of *Peptidoglycan*, also called *murein*.
18. Peptidoglycan or murein is a polymer consisting of sugars and amino acids that forms a mesh-like layer outside the plasma membrane of most bacteria, forming the cell wall.
19. Gram positive bacteria have less lipids and more peptidoglycan as compared to Gram negative bacteria.
20. If lipopolysaccharides did not appear in the wall of bacteria on staining then it will be known as Gram positive as we know lipopolysaccharide layer is a feature of Gram negative bacteria.
21. Membranous invaginations present in bacteria are known as mesosomes. These carry enzymes for respiration and cell division.
22. Dormant, thick walled desiccation resistant structures are cyst while spores are metabolically dormant bodies and are produced at a late stage of cell growth.
23. *Mycoplasma* is the only genus of prokaryotes which are devoid of peptidoglycan cell wall.
24. Bacterial plasma membrane is involved in DNA replication, cellular division and respiratory metabolism while maintenance of cell shape is the function of cell wall.

25. Phospholipid and proteins are components of membrane of prokaryotic cell and eukaryotic cells. Cholesterol is present in the cell membrane of eukaryotic cells only.
26. As spore formation occurs during unfavorable conditions i.e. selective antibiotic pressure and heat while differentiation of vegetative cells takes place in favorable conditions.
27. For many pathogenic bacteria, flagellum-dependent motility and chemotaxis are present.
28. Goblet cells are eukaryotic cells and have nucleus in them while nucleoid is found in prokaryotic cells.
29. Mesosomes help with cell division, aiding cell wall synthesis and DNA replication.



30. *Lactobacillus* is a genus of Gram-positive, aerotolerant anaerobes or microaerophilic, rod-shaped, non-spore-forming bacteria. So don't have nucleus for being a prokaryotic cell.
31. Bacteria do not have a membrane-bound nucleus, and their genetic material is typically a single circular bacterial chromosome of DNA located in the cytoplasm in an irregularly shaped body called the nucleoid.
32. Due to origin of replication bacteria can replicate its genome.
- 33.

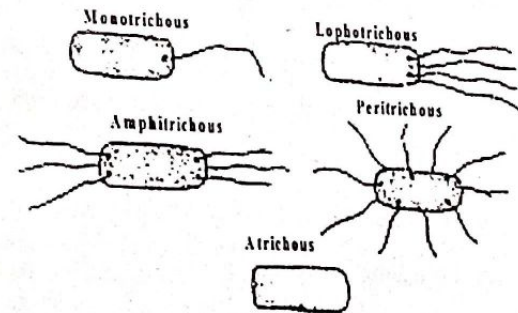
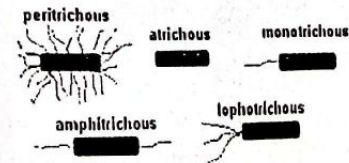
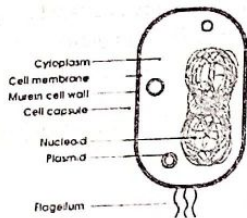


Fig: Flagellar arrangement in Bacteria

34. Bacteria can divide by binary fission.
- 35.



36. Binary fission is asexual mode of reproduction in which one bacteria divide itself into two daughter cells.
- 37.



38. Archaea are ancient group of bacteria. They are different from eubacteria and more related to eukaryotes. One of the feature is their resistance against antibiotics.
39. Flagella of prokaryotes differ from eukaryotic flagella in many aspects such as type of protein, their length and number. They have one similarity and that is their function as both help in motility.
40. Many bacteria have flagella but there are some exceptions. Oval shaped bacteria (Cocci) rarely have flagella.
41. True pili are present only in gram negative bacteria.
42. Bacteria that live in intestine and produce vitamin K are useful strain of *E. coli* which are Gram negative bacilli.
43. Now antibiotics are used on regular basis and bacteria are getting resistance against antibiotics due to enhanced exposure.
44. Chemotherapeutic agents are the antibiotics that work with natural defense and stop the growth of bacteria and other microbes.
45. The bacteria present in canned food is *C. botulinum* and causes severe form of food poisoning. Botulism develops by the use of improperly canned or otherwise preserved food, especially meat.
46. Antibiotics and hormones are heat sensitive molecules and can be degraded if sterilized with the dry heat or moist heat. That is why such substances are sterilized by using specialized filters.
47. *Antibiotics* are of two types i.e. natural and synthetic. So these can be synthesized in laboratory, moreover these can be or cannot be protein in nature and produce side effects.
48. A vaccine is a biological preparation that provides active acquired immunity to a particular infectious disease and this treatment is done by using attenuated culture of bacteria.
49. Tetracycline has been on the market for over 60 years and is used in the treatment of many gram negative and gram positive infections; it causes permanent staining of the teeth if used in children less than the age of 8.
50. Antibiotics, also known as antibacterial, are medications that destroy or slow down the growth of bacteria by interfering with bacterial cell wall synthesis, plasma membrane functions, protein synthesis, enzymes actions, DNA replication etc.
51. Heating is the most commonly used method of sterilization and *dry heat* kills by *oxidation* effects.
52. Microbistatic effect is the reduction of reproductive abilities of bacteria by chemicals and microbicidal effect is killing of all forms of bacteria. Alcohol, antibiotics and formaldehyde kills all living forms of bacteria so they have microbicidal effect.
53. Gamma rays have wavelength below 300 nm. They effectively eradicate bacteria and all living cells.
54. Membrane filters sterilize compounds that are heat sensitive like seras, hormone and antibiotics. Flasks have glassy material and it can be sterilized by heat.

Male Reproductive System

TOPIC-WISE MCQs

- Q.1 Which one of the following is a diploid structure?
A. Secondary spermatocyte
B. Spermatid
C. Primary spermatocyte
D. Spermatozoa
- Q.2 Which one of the following causes growth and development of germinal epithelium of the testes?
A. Inhibin
B. LH
C. Testosterone
D. FSH
- Q.3 Production of slightly acidic fluid with citrate as a main nutrient source is the function of:
A. Bulbourethral gland
B. Prostate gland
C. Seminal vesicles
D. Cowper's gland
- Q.4 Structure that undergoes meiosis I is:
A. Primary spermatocyte
B. Spermatid
C. Secondary spermatocyte
D. Spermatogonium
- Q.5 Spermatozoa are formed from spermatids as a result of:
A. Mitosis
B. Differentiation
C. Meiosis I
D. Meiosis II
- Q.6 Prior to emission and ejaculation, spermatozoa are stored in:
A. Urethra
B. Seminal vesicles
C. Epididymis
D. Prostate gland
- Q.7 Fructose production as nutritional component for sperms is the function of:
A. Bulbourethral gland
B. Prostate gland
C. Seminal vesicles
D. Seminiferous tubules
- Q.8 Human sperm and ova show similarities in following aspect:
A. Both are haploid
B. Both carry identical genetic makeup
C. Both are having approximately same size
D. Both possess good mobility
- Q.9 All of the following contributes to the formation of semen except:
A. Seminal vesicles
B. Cowper's gland
C. Prostate gland
D. Vas deferens
- Q.10 Correct sequence of events in spermatogenesis is:
A. Spermatogonia > Spermatids > Spermatocytes > Spermatozoa
B. Primary spermatocytes > Secondary spermatocytes > Spermatozoa
C. Spermatogonia > Primary spermatocyte > Secondary spermatocytes > Spermatid > Spermatozoa
D. Secondary spermatocyte > Spermatozoa > Spermatogonia > Spermatids
- Q.11 All of the following structures are paired except:
A. Testes
B. Seminal vesicles
C. Bulbourethral gland
D. Prostate gland
- Q.12 Main function performed by bulbourethral gland in humans is/are:
A. Sperm maturation
B. Neutralization of urethra
C. Sperm production
D. Semen formation

Q.13 How many spermatozoa and ova are produced from 50 primary spermatocytes and 50 primary oocytes?

- A. 200 spermatozoa and 100 ova
- B. 200 spermatozoa and 50 ova
- C. 100 spermatozoa and 50 ova
- D. 100 spermatozoa and 100 ova

Q.14 Motile and completely mature cell with flagellum is:

- A. Spermatid
- B. Spermatocyte
- C. Spermatogonium
- D. Spermatozoa

Q.15 The first cells produced by the repeated cell division of germinal epithelium of testis are: (MDCAT 2010)

- A. Interstitial cells
- B. Secondary spermatocytes
- C. Spermatogonia
- D. Spermatids

Q.16 A type of cell in human testes which produces testosterone is called: (MDCAT 2011, 2013)

- A. Interstitial cells
- B. Sertoli cells
- C. Germ cells
- D. Spermatocytes

Q.17 Which one of the following differentiates directly into mature sperm? (MDCAT 2011)

- A. Primary spermatocyte
- B. Spermatogonia
- C. Secondary spermatocyte
- D. Spermatid

Q.18 What is the location of interstitial cells in testes? (MDCAT 2013)

- A. Inside the seminiferous tubules
- B. Among the germinal epithelial cells
- C. Between the seminiferous tubule
- D. Around the testes

Q.19 Spermatogonia differentiate directly into? (MDCAT 2013)

- A. Primary spermatocytes
- B. Spermatozoa
- C. Secondary spermatocytes
- D. Spermatids

Q.20 All of the following are parts of male copulatory organ except:

- A. Prepuce
- B. Urethra
- C. Glans penis
- D. Ejaculatory duct

Q.21 Sperms are nourished and activated through:

- A. Vas deferens
- B. Semen
- C. Seminal vesicle
- D. Prostate gland

Q.22 A cell containing two copies of each functional gene:

- A. Polar body
- B. Ovum
- C. Secondary spermatocytes
- D. Spermatogonium

Q.23 Each testis is divided into _____ lobules.

- A. 100-150
- B. 150-200
- C. 250-300
- D. 300-350

Q.24 Which of the following hormone is responsible for the control of spermatogenesis at normal rate?

- A. FSH
- B. Testosterone
- C. LH
- D. Inhibin

Q.25 During spermatogenesis, the _____, which are haploid cells eventually mature into spermatozoa/mature sperms? (MDCAT 2019)

- A. Secondary spermatocytes
- B. Spermatogonia
- C. Primary spermatocytes
- D. Spermatids

Female Reproductive System

Q.26 Layer of uterus that is under control of oestrogen:

- A. Mesometrium
- B. Endometrium
- C. Myometrium
- D. Perimetrium

Q.27 After fertilization, embryo implants itself to the _____ part of uterus.

- A. Endometrium
- B. Myometrium
- C. Mesometrium
- D. Perimetrium

Q.28 Cervix is blocked by:

- A. Layer of tissues
- B. Plug of mucus
- C. Sphincter
- D. None

Q.29 Fertilization of a secondary oocyte by sperm takes place at:

- A. Proximal part of cervix
- B. Distal part of oviduct
- C. Proximal part of uterine tube
- D. Distal part of cervix

Q.30 The development of secondary oocyte into ovum is completed in:

- A. Uterine tube
- B. Ovary
- C. Uterus
- D. Graffian follicle

Q.31 Pick the correct statement among the followings:

	Fertilization	Implantation	Conception
A.	Oviduct	Cervix	Uterus
B.	Uterine tube	Endometrium	Uterus
C.	Fallopian tube	Vagina	Uterus
D.	Oviduct	Endometrium	Cervix

Menstrual Cycle

Q.32 What will be the effect on the duration of menstrual cycle if one of the ovaries is removed?

- A. Duration will be more than 28 days
- B. Menstrual cycle stops completely
- C. Duration will be less than 28 days
- D. Menstrual cycle remains unaffected

Q.33 Progesterone production within ovaries is accomplished by following structure:

- A. Primary follicle
- B. Ruptured follicle
- C. Graffian follicle
- D. Corpus albicans

Q.34 The layer of uterus that is shed with each reproductive cycle is:

- A. Mesometrium
- B. Endometrium
- C. Myometrium
- D. Perimetrium

Q.35 Maximum chances of fertilization in human females exist usually during _____ of reproductive cycle.

- A. 11th to 14th day
- B. Immediately after menstruation
- C. 14th to 16th day
- D. 6th to 9th day

Q.36 In a menstrual cycle of 45 days, what would be the most probable day of ovulation?

- A. 14th
- B. 31th
- C. 40th
- D. 20th

Q.37 Endometrium shows maximum thickness during:

- A. Start of proliferative phase
- B. Secretory phase
- C. End of Proliferative phase
- D. Menstruation

Q.38 Menstruation is the discharge of:

- A. Blood, water and cellular debris
- B. Blood, mucous and cellular debris
- C. Lymph, mucous and solid debris
- D. Lymph, blood and cellular debris

PMC Topic-11

- Q.39 Menstruation usually continues for:
A. 3-7 days
C. 1-3 days
- Q.40 In young females, ovulation occurs at _____ day of reproductive cycle.
A. 18th
C. 28th
- Q.41 At ovulation egg is released as:
A. Primary oocyte
C. Secondary oocyte
- Q.42 One of the followings is related to ovary:
A. Menstrual phase
C. Secretory phase
- Q.43 Only Graffian follicle grows with egg. Rest of follicles are destroyed by a process:
A. Follicle atresia
C. Ovulation
- Q.44 Fraternal twins, triplets and quadruplets in humans occur when:
A. There is an excess of sperms
C. Menstruation occurs
- Q.45 Which layer of uterus undergoes cyclic changes during menstrual cycle?
A. Mesoderm
C. Perimetrium
- Q.46 First menstrual cycle starts at puberty. This is termed as:
A. Menopause
C. Metrorrhagia
- Q.47 Ovulation day in normal menstrual cycle is on day:
A. 13th
C. 14th
- Q.48 Maintenance of pregnancy is made possible mainly by:
A. FSH
C. Prolactin
- Q.49 Complete stop of menstrual cycle is called:
A. Menopause
C. Andropause
- Q.50 Yellowish glandular structure formed after the release of egg from follicle is called:
(MDCAT 2014)
A. Corpus callosum
C. Graffian follicle
- Q.51 On puberty, the development of primary follicles is stimulated by: (MDCAT 2014)
A. ICSH
C. FSH
- Q.52 In females, FSH stimulates the ovary to produce: (MDCAT 2015)
A. Progesterone
C. Prolactin
- Q.53 The oocyte released during ovulation is in: (MDCAT 2015)
A. Anaphase I
C. Prophase I
- B. 20-22 days
D. 15-17 days
- B. 14th
D. 24th
- B. Ovum
D. Polar body
- B. Proliferative phase
D. Luteal phase
- B. Osteoporosis
D. Both A and C
- B. Over activity of pituitary occurs
D. Multiple ovulations occurs
- B. Myometrium
D. Endometrium
- B. Menarche
D. None
- B. 18th
D. Cannot be measured
- B. Progesterone
D. Both A and B
- B. Menarche
D. Menstruation
- B. Corpus luteum
D. Follicle atresia
- B. LH
D. Estrogen
- B. Estrogen
D. Oxytocin
- B. Metaphase I
D. Metaphase II

- Q.54 Shortest phase in the menstruation cycle is:
A. Ovulatory phase
C. Follicular phase
- Q.55 Female menstrual cycle is controlled by:
A. Progesterone
C. Estrogen
- Q.56 In which phase of human female menstrual cycle, endometrium prepares for the implantation of embryo?
A. Proliferative phase
C. Menstrual phase
- Q.57 Events of menstrual cycle are regulated by the:
A. Ethylene
C. Gonadotrophins
- Q.58 Decrease of FSH and increase of estrogen cause pituitary gland to secrete:
A. Somatotrophin
C. Luteinizing hormone
- Q.59 FSH stimulates the production of estrogen hormone which has two targets and _____.
A. Uterus, posterior pituitary
C. Ovaries, uterus
- Q.60 Ovulation is suppressed by progesterone via:
A. Inhibition of LH only
C. Inhibition of FSH & stimulation of LH
- Q.61 Which of the following hormone suppresses ovulation?
A. Progesterone
C. Insulin
- Q.62 Which of the following hormone causes ovulation?
A. LH
C. Progesterone
- Q.63 Which hormone is released in female in response to FSH from pituitary gland?
A. Oxytocin
C. ADH
- Q.64 Which of the following hormone acts on the uterus wall for thickening?
A. Zona pellucida
C. Progesterone
- Q.65 Which hormonal pair would maintain the endometrium and make it receptive for implantation of embryo?
A. Luteinizing Hormone and Progesterone
B. Estrogen and Follicle Stimulating Hormone
C. Luteinizing Hormone and Follicle Stimulating Hormone
D. Estrogen and Progesterone
- Q.66 Which of the following hormone stimulates the ovulation from the follicle into oviduct?
A. Luteinizing hormone
C. Follicle stimulating hormone
- B. Luteal phase
D. Menstrual phase
- B. Gonadotropin
D. ICSH
- B. Secretory phase
D. Ovulation phase
- B. Auxins
D. Gibberellins
- B. Testosterone
D. Spermatogonium
- B. Uterus, anterior pituitary
D. Ovaries, hypothalamus
- B. Inhibition of LH & stimulation of FSH
D. Inhibition of both FSH & LH
- B. FSH
D. Prolactin
- B. Estrogen
D. FSH
- B. LH
D. Progesterone
- B. Oxytocin
D. Follicle stimulating hormone
- (MDCAT 2015)
- (MDCAT 2016)
- (MDCAT 2016)
- (MDCAT 2017)
- (MDCAT 2017)
- (MDCAT 2017)
- (MDCAT 2017)
- (MDCAT 2018)
- (MDCAT 2018)
- (MDCAT 2019)
- (MDCAT 2019)

PMC Topic-11

Reproduction

- Q.67 The hormone produced at this particular stage in the menstrual cycle shown in the diagram is (egg is shown by arrow):
 A. Oxytocin
 C. Progesterone
 B. Follicle stimulating hormone
 D. Luteinizing hormone
 (AJK 2019)
- Q.68 On the onset of puberty in the females, the pituitary gland releases the: (AJK 2019)
 A. Progesterone
 C. Oxytocin
 B. Luteinizing hormone
 D. Follicle stimulating hormone
 (AJK 2019)
- Q.69 Secretion of FSH is inhibited by:
 A. Testosterone
 C. Progesterone
 B. Estrogen
 D. LH
 (AJK 2019)
- Q.70 Progesterone is secreted by:
 A. Corpus luteum
 C. Uterine epithelium
 B. Ripening follicles
 D. Fertilized egg
 (ETEA 2019)
- Q.71 Which one of the following represents the changes that occur in the ovary and the uterus approximately every 28 days involving ovulation with the breakdown and loss of the lining of the uterus?
 A. Ovulation
 C. Menstrual cycle
 B. Uterine cycle
 D. Embryo formation
 (PMC 2020)
- Q.72 Which of the following hormones of the pituitary gland regulate the menstrual cycle?
 A. Follicle stimulating hormone and estrogen
 B. Luteinizing hormone and estrogen
 C. Follicle stimulating hormone and Luteinizing hormone
 D. Estrogen and progesterone
 (PMC 2020)
- Q.73 Oxytocin performs action on:
 A. Perimetrium
 C. Epimetrium
 B. Myometrium
 D. Endometrium
- Q.74 It is false about placenta:
 A. Produces hormones
 C. Develops during 1th month of pregnancy
 B. Provides oxygen and nutrients to fetus
 D. Removes waste material from fetus blood

In Vitro Fertilization

- Q.75 An egg is fertilized in laboratory and implanted in uterus for development. This is called:
 A. Test tube baby
 C. *In vitro* fertilization
 B. Cloning
 D. Both A and B
- Q.76 To overcome infertility, which technique is used:
 A. *In vitro* fertilization
 C. Both A and B
 B. *In vivo* fertilization
 D. None of these

Sexually Transmitted Diseases

- Q.77 In _____, mucous membrane of urinogenital tract is mainly affected.
 A. Gonorrhoea
 C. Syphilis
 B. Genital herpes
 D. AIDS

PMC Topic-11

Reproduction

- Q.78 *Neisseria gonorrhoea* causes:
 A. Syphilis
 C. Gonorrhoeae
 B. Genital herpes
 D. AIDS
- Q.79 It affects reproductive organs, eye bone joints and CNS in patient:
 A. Syphilis
 C. Gonorrhoeae
 B. Genital herpes
 D. AIDS
- Q.80 Sexually transmitted disease caused by a virus and results in genital ulcers:
 A. Syphilis
 C. Gonorrhoeae
 B. Genital herpes
 D. AIDS

ANSWER KEY

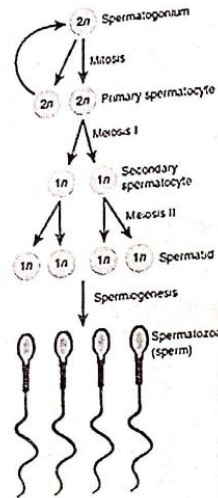
TOPIC-WISE MCQs

1	C	11	D	21	B	31	B	41	C	51	C	61	A	71	C
2	D	12	B	22	D	32	D	42	D	52	B	62	A	72	C
3	B	13	B	23	C	33	B	43	A	53	D	63	B	73	B
4	A	14	D	24	D	34	B	44	D	54	A	64	C	74	C
5	B	15	C	25	D	35	C	45	D	55	B	65	D	75	C
6	C	16	A	26	B	36	B	46	B	56	B	66	A	76	A
7	C	17	D	27	A	37	B	47	C	57	C	67	C	77	A
8	A	18	C	28	B	38	B	48	B	58	C	68	D	78	C
9	D	19	A	29	C	39	A	49	A	59	B	69	B	79	A
10	C	20	D	30	A	40	B	50	B	60	D	70	A	80	B

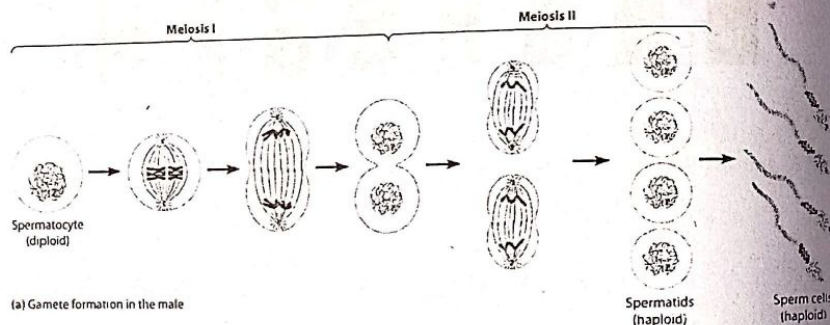
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1.



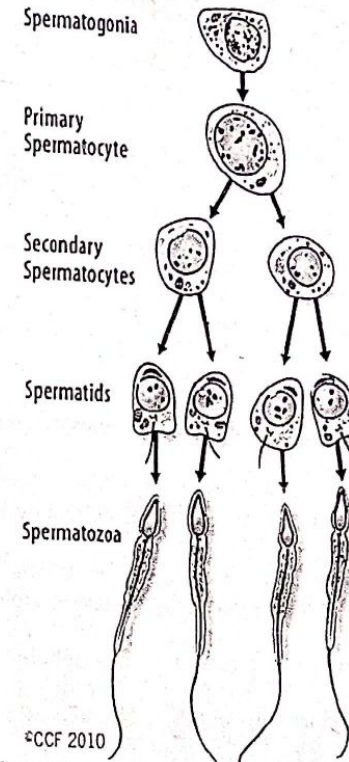
2. Follicle stimulating hormone is one of the hormones essential to pubertal development and the function of women's ovaries and men's testes. In women, this hormone stimulates the growth of ovarian follicles in the ovary before the release of an egg from one follicle at ovulation.
3. The prostate gland is a male reproductive organ whose main function is to secrete prostate fluid (acidic fluid with citrate), one of the components of semen.
- 4.



5. Spermatid is spherical, non-motile cell. Through differentiation, it is changed into spermatozoa where it forms tail and becomes motile.
6. The epididymis is a tightly coiled mass of thin tubes that carries sperm from the testes to the vas deferens. Sperm matures as it passes through the epididymis.
7. Seminal vesicles release up to 60% of the fluid found in semen. The other 40% is produced by the prostate and bulbourethral glands. The fluid produced by seminal vesicles contains several key components: Fructose: which is a sugar that is produced to provide energy for swimming sperm cells.

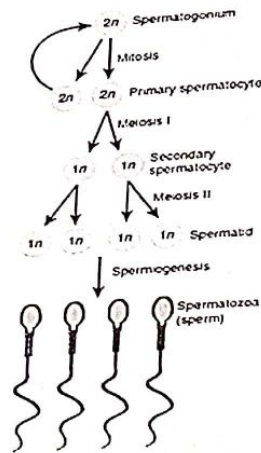
8.
9.
10.

Both the sperm and ova are haploid cells. All others are dissimilarities. The vas deferens transports mature sperm to the urethra.

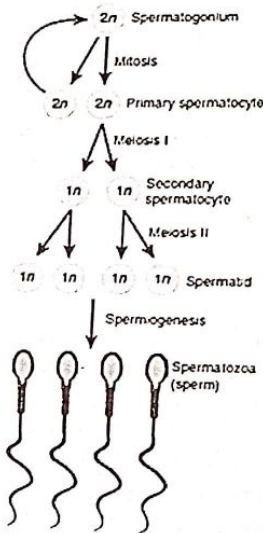


11. The accessory glands of the male reproductive system are the seminal vesicles (paired), bulbourethral gland (paired) and the prostate gland (unpaired). Testes are also paired.
12. Bulbourethral glands produce a mucus-like fluid called pre-ejaculate. This fluid is a viscous, clear, and salty liquid that neutralizes any residual acidity in the urethra.
13. Each primary spermatocyte produces four sperms while each primary oocyte gives rise to one ovum (secondary oocyte) and three polar bodies.
14. The mature motile male sex cell of an animal, by which the ovum is fertilized, typically having a compact head and one or more long flagella for swimming.
15. Spermatogonium cell produced at an early stage in the formation of spermatozoa, formed in the wall of a seminiferous tubule and giving rise by mitosis to spermatocytes.
16. Leydig cells or interstitial cells are the cells present in the interstitial space of the testis. In fact, they are located in the connective tissue that surrounds the seminiferous tubules. These cells are responsible for testosterone production in male body.
17. Spermatid is spherical, non-motile cell. Through differentiation, it is changed into spermatozoa where it forms tail and becomes motile.
18. Leydig cells or interstitial cells are the cells present in the interstitial space of the testis. In fact, they are located in the connective tissue that surrounds the seminiferous tubules. These cells are responsible for testosterone production in male body.

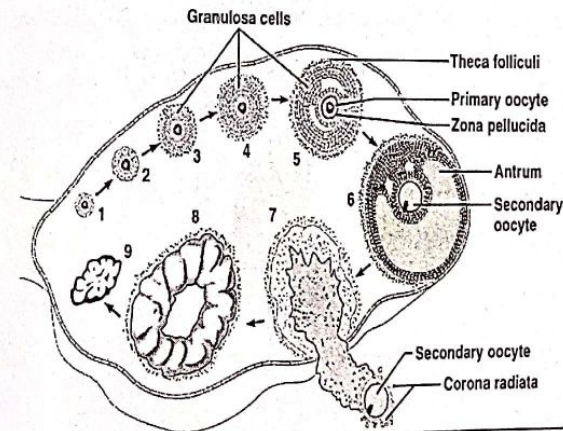
19.



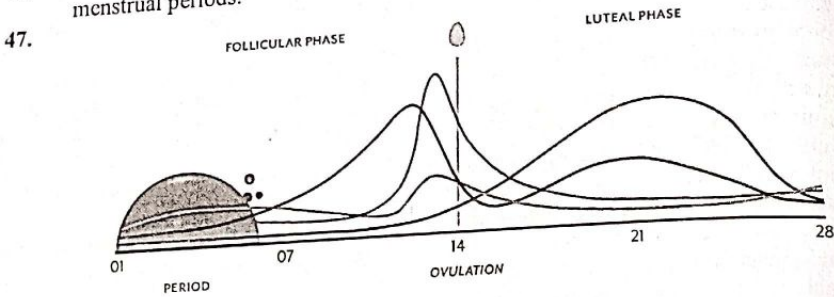
20. Ejaculatory duct is formed by combining of ductus deferens and duct of seminal vesicle so it is not part of male copulatory organ.
21. Semen is formed by secretion of 3 accessory glands. It contains different compounds such as fructose, citrate etc. These chemicals are required for nourishment and activation of sperms.
22. Ovum, polar body and secondary spermatocytes have one copy of each functional gene as they all are formed by meiosis I. Spermatogonium is diploid because it has not undergone meiosis yet.
23. Each testis contains many lobules and each lobule contains 1 to 4 tightly coiled seminiferous tubules.
24. Inhibin hormone is produced by sertoli cell. It serves to control the spermatogenesis at normal rate.
- 25.



26. Thickness of endometrium changes in different phases of menstrual cycle. Estrogen and progesterone make it more thick and spongy.
27. Under normal circumstances, fertilization occurs in one of the Fallopian tubes, and then the fertilized egg begins to make its way to the uterus. By about the fifth day after fertilization, the embryo finally reaches the uterus, where it implants itself in the endometrium.
28. Cervix is a narrow entrance to the uterus from the vagina. It is normally blocked by a plug of mucus.
29. Oviduct is also called as uterine tube. Its proximal end is important for fertilization.
30. Secondary oocyte proceeds to ovum if it is fertilized. The site of fertilization is uterine tube.
31. Fertilization takes place in oviduct, zygote implanted in endometrium and conception takes place uterus.
32. An oophorectomy is a surgical procedure to remove one or both ovaries. The ovaries produce eggs as well as the hormones estrogen and progesterone. Removal of one remaining ovary is not damaged.
33. Ruptured follicle after ovulation change to yellow glandular structure called as corpus luteum, which secrete progesterone.
34. The endometrium changes throughout the menstrual cycle. It becomes thick and rich with blood vessels to prepare for pregnancy. If pregnancy does not occur, part of the endometrium is shed, causing menstrual bleeding.
35. Normally 14th day is the day of ovulation and according to the life span of egg and sperms option C is the most appropriate one.
36. Under normal conditions, luteal phase of menstrual cycle is of 14 days. If cycle is going to be completed in 45 days, then $45 - 14 = 31$, so 31st day will be day of ovulation.
37. During the secretory or luteinizing phase (14th to 28th day) the endometrium differentiates itself due to the influence of progesterone (from the corpus luteum) and attains its full maturity.
38. About half of menstrual fluid is blood. This blood contains sodium, calcium, phosphate, iron, and chloride, the extent of which depends on the woman. As well as blood, the fluid consists of cervical mucus, vaginal secretions, and endometrial tissue.
39. The menstrual cycle is governed by hormonal changes. It takes 3-7 days to regain original form of uterus for next cycle.
40. In normal menstrual cycle, ovulation usually occurs at mid cycle, i.e. 14th day.
- 41.



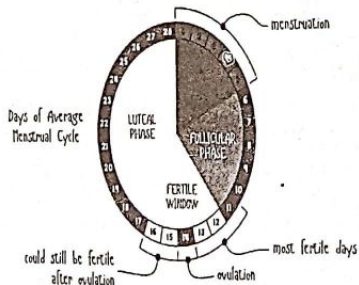
42. Menstrual phase, proliferative and secretory phases are related to uterine cycle.
43. During to stimulus of FSH more than one follicles undergo development. Single one will survive due to competition remaining will degenerate by process of follicle atresia.
44. A woman can have multiple ovulations in a single cycle. This means that several eggs (most often two) are released from the ovaries. However, both eggs will be released within 24h from the ovaries and result in multiple births.
45. During menstruation hormone dependent layers which developed on endometrium, released out from body.
46. Metrorrhagia is uterine bleeding at irregular intervals, particularly between the expected menstrual periods.



Ovarian Cycle

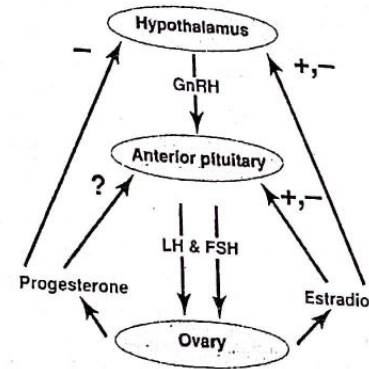
48. Progesterone continuous production will maintain thickness of endometrium longing which help to maintain pregnancy.
49. Andropause is a condition that is associated with the decrease in the male hormone testosterone. Menarche is first menstrual cycle of female. Menstruation is first phase of menstrual cycle in which bleeding start.
50. The follicle cells, after release of egg, are modified to form a special structure called corpus luteum. This yellowish glandular structure starts secreting progesterone, which develops endometrium and makes it receptive for implantation and placentation.
51. Pituitary gland on the onset of puberty, releases FSH which stimulates the development of several primary follicles.
52. Ovary under influence of FSH produces estrogen.
53. Secondary oocyte undergoes through meiosis II but arrested in Metaphase II. It is released in this stage from ovary and does not proceed further until fertilized.

Ovulation Cycle

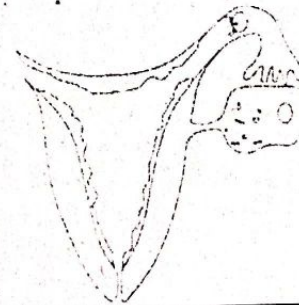


fertility window and menstrual cycles vary from person to person

55. FSH and LH are called as Gonadotropins. They are responsible for regulation of menstrual cycle.



56. The second half of the menstrual cycle after ovulation; the corpus luteum secretes progesterone which prepares the endometrium for the implantation of an embryo.
57. Events of menstrual cycle are regulated by pituitary gonadotrophins.
58. Decrease of FSH and increase of estrogen, causes the pituitary gland to secrete LH which induces ovulation.
59. Estrogen, on one hand, stimulates the endometrium and vascularizes it. On the other hand, it inhibits secretion of FSH from anterior lobe of pituitary.
60. An increase of progesterone inhibits the release of LH, because that's what normally causes progesterone to be secreted
61. An increase of progesterone inhibits the release of LH, because that is what normally causes progesterone to be secreted.
62. LH causes ovulation, which results the formation of ruptured follicles known as corpus luteum which is source of progesterone.
63. Ovary under influence of FSH produces estrogen from follicle cells, which cause thickness of endometrium and stimulate LH from anterior lobe of pituitary
64. Thickness of endometrium changes in different phases of menstrual cycle. Estrogen and progesterone make it more thick and spongy.
65. Both estrogen and progesterone have supportive effect on endometrium.
66. LH causes ovulation, which results the formation of ruptured follicles known as corpus luteum which is source of progesterone.



68. On onset of puberty pituitary gland start FSH production which stimulate follicles development in ovary.
69. Estrogen act as inhibitor for FSH and play stimulatory role for LH, which cause ovulation.
70. A corpus luteum is a mass of cells that forms in an ovary and is responsible for the production of the hormone progesterone during early pregnancy. The role of the corpus luteum depends on whether or not fertilization occurs.
71. Menstrual cycle is the monthly cycle of changes in the ovaries and the lining of the uterus (endometrium), starting with the preparation of an egg for fertilization.
72. The menstrual cycle is regulated by hormones. LH and FSH, which are produced by the pituitary gland, promote ovulation and stimulate the ovaries to produce estrogen and progesterone.
73. Oxytocin is released from posterior pituitary and it starts muscle contraction and relaxation of smooth muscles in myometrium. This activity results in process of birth.
74. Placenta is a connection between mother and developing child for transport of material. It starts establishing during 4th to 5th month of pregnancy.
75. In vitro fertilization is a technique which benefits couple who are unable to become parents by natural process. In this procedure sperm from male and ovum from female are combined in a test tube in controlled lab condition and then zygote is implanted in uterus of female. It is a way to overcome infertility.
76. In vitro fertilization is a technique which benefits couple who are unable to become parents by natural process. In this procedure sperm from male and ovum from female are combined in a test tube in controlled lab condition and then zygote is implanted in uterus of female. It is a way to overcome infertility.
77. In Gonorrhoea bacteria invades mucous membrane of urinogenital tract and in females it can damage cervix also.
78. Syphilis is caused by *Treponema pallidum*. Genital herpes and AIDS are caused by viruses; Herpes simplex type II and HIV respectively.
79. Syphilis spreads in three stages known as primary, secondary and tertiary syphilis. Initially it affects skin only but at stage of tertiary syphilis, this diseases damages most of the vital organs in body.
80. Genital herpes is caused by a virus and it affects genital parts resulting in genital ulcers and soreness.

12 SUPPORT & MOVEMENT

TOPIC

PRACTICE EXERCISE

TOPIC-WISE MCQs

Cartilage and Bones

- Q.1 It is not a true statement about bones and cartilages:
 A. Both contain living cells
 B. Both contain various types of living cells
 C. Both have ground matrix of collagen
 D. Both are part of endoskeleton
- Q.2 Which type of cartilage is/are present in our respiratory passage?
 A. Fibro cartilage
 B. Elastic cartilage
 C. Hyaline cartilage
 D. All A, B, C
- Q.3 All of the following are true about collagen except:
 A. Inelastic
 B. Flexible
 C. Living
 D. Protein
- Q.4 Cartilage is covered by:
 A. Periosteum
 B. Pericondrium
 C. Perimysium
 D. Perineurium
- Q.5 Major protein of connective tissues:
 A. Collagen
 B. Actin
 C. Titin
 D. Albumin

Divisions of Human Skeleton

- Q.6 Tibia is found in:
 A. Skull
 B. Lower leg
 C. Face
 D. Upper arm
- Q.7 Number of bones present in vertebral column:
 A. 24
 B. 26
 C. 33
 D. 35
- Q.8 It is not part of axial skeleton:
 A. Sternum
 B. Atlas and axis
 C. Inferior Choncha
 D. Patella
- Q.9 Ribs which are only attached to spinal cord are:
 A. True ribs
 B. False ribs
 C. Floating ribs
 D. Costal arch

Q.10 Choose an option containing correct information:

A.	2 paired facial bones	6 unpaired facial bones
B.	6 paired facial bones	2 unpaired facial bones
C.	4 paired cranial bones	2 unpaired cranial bones
D.	6 paired cranial bones	4 unpaired cranial bones

- Q.11 How many coxal bones are present in human body?
 A. 3
 B. 6
 C. 2
 D. 4

Types of Joints

- Q.12 Knee and elbow joints are examples of:
 A. Ball and socket joint
 B. Cartilaginous joint
 C. Hinge joint
 D. Fibrous joint

PMC Topic-12

- Q.13 Which of the following is an example of synovial joint?
 A. Joint between clavicle and scapula
 B. Joint between radius and ulna
 C. Joint between rib and vertebral column
 D. Joints between skull bones
- Q.14 Elbow joint is an example of:
 A. Ball and socket joint
 B. Fibrous joint
 C. Hinge joint
 D. Pivot joint
- Q.15 Joint that is immovable:
 A. Sutures
 B. Saddle
 C. Ball and Socket
 D. Pubic symphysis
- Q.16 Joint between costal arch and sternum is:
 A. Fibrous
 B. Cartilaginous
 C. Ball and Socket
 D. Synovial
- Disorders of Human Skeleton (Gout and Arthritis)**
- Q.17 Acute forms of arthritis usually results from _____ invasion.
 A. Viral
 B. Fungal
 C. Bacterial
 D. Bacteriophage
- Q.18 Antibodies attack joints in:
 A. Osteoarthritis
 B. Juvenile arthritis
 C. Gouty arthritis
 D. Rheumatoid arthritis
- Comparison of Muscle Types**
- Q.19 Irregular striations and involuntary control is related to:
 A. Smooth muscle cells
 B. Cardiac muscle cells
 C. Skeletal muscle cells
 D. Fibroelastic cartilage cells
- Q.20 Which one of the following is correct regarding ligaments and tendons?
 A. Both are inelastic
 B. Both are specialized connective tissue
 C. Both are elastic
 D. Both form joint capsule
- Q.21 Earliest form of muscles is:
 A. Cardiac
 B. Skeletal
 C. Smooth
 D. Striated
- Q.22 Brachioradialis:
 A. Originates from radius
 B. Originates from ulna
 C. Is inserted into radius
 D. Is inserted into ulna
- Q.23 The main functional partners of bones are:
 A. Tendon
 B. Ligament
 C. Skeletal muscle
 D. Nerves
- Q.24 The type of muscle which exhibits striations at regular intervals, is multinucleated and whose control is neurogenic (controlled by the nervous system) is the:
 A. Smooth muscle
 B. Cardiac muscle
 C. Skeletal muscle
 D. Involuntary muscle
- Q.25 Which one of the following muscles are considered as "Voluntary muscles"? (PMC 2020)
 A. Smooth muscles
 B. Skeletal muscles
 C. Cardiac muscles
 D. Glandular muscles
- Q.26 Which one of the following are "myogenic" type of muscles? (PMC 2020)
 A. Smooth muscles
 B. Skeletal muscles
 C. Cardiac muscles
 D. Glandular muscles

PMC Topic-12

Structure and Ultra-Structure of Skeletal Muscles

- Q.27 Connective tissue wrapping around a muscle that is found continuous with tendons:
 A. Perimysium
 B. Endomysium
 C. Epimysium
 D. Perichondrium
- Q.28 Sarcoplasmic reticulum is like:
 A. Golgi bodies
 B. Smooth endoplasmic reticulum
 C. Cytoskeletal fibers
 D. Ribosome
- Q.29 Sarcolemma is primarily made up of:
 A. Lipoprotein
 B. Glycolipids
 C. Glycoprotein
 D. Nucleoproteins
- Q.30 Which one of the following structures serves as a center of sarcomere?
 A. H-Zone
 B. Z-band
 C. M-line
 D. A-band
- Q.31 Which one of the following is correct regarding A-band?
 A. It is non-polarizing
 B. It contains only myosin
 C. It is isotropic
 D. Myosin acts as a polarizer of light
- Q.32 T-tubules in human skeletal muscles are present at:
 A. Z-line
 B. M-line
 C. A-I junction
 D. H-zone
- Q.33 Diameter of each myofibril is approximately _____.
 A. 2 μm
 B. 10 μm
 C. 100 nm
 D. 100 μm
- Q.34 Which of the following is a true statement?
 A. Muscle cell has many muscle fibers
 B. Muscle fiber has many muscle cells
 C. Muscle cell has many myofibrils
 D. Sarcomere has bundles of muscle fibers
- Q.35 Which of the following band allows most of the light to pass through it?
 A. A-band
 B. Muscle bundle
 C. I-band
 D. Muscle fiber
- Q.36 Chief component of thin filaments is:
 A. Actin
 B. Troponin
 C. Myosin
 D. Fibrous proteins
- Q.37 The sliding protein of muscle:
 A. Tubulin
 B. Myoglobin
 C. Myosin
 D. Actin
- Q.38 The point of attachment of the nerve to the muscle is called a _____ junction.
 A. Neuro-muscular
 B. Mechanical
 C. Chemical
 D. Synaptic
- Q.39 The repeated protein pattern of myofibrils is called: (MDCAT 2014)
 A. Sarcomere
 B. Sarcolemma
 C. Zyomere
 D. Cross bridges
- Q.40 A sarcomere is the region of a myofibril between two successive: (MDCAT 2015)
 A. M-lines
 B. I-bands
 C. Z-lines
 D. T-tubules
- Q.41 The sarcolemma of muscle fiber folds inwards and forms a system of tubes which runs through the sarcoplasm called: (MDCAT 2015)
 A. Myofilaments
 B. Z-lines
 C. Sarcoplasmic reticulum
 D. Transverse tubules

- Q.42 Each muscle fiber is surrounded by a modified cell membrane called: (MDCAT 2016, 2017)
 A. Sarcolemma
 B. Myosin Filament
 C. Sarcomere
 D. Myofilament
- Q.43 Overlapping of thick filament occurs in: (MDCAT 2017)
 A. A-Band
 B. M-line
 C. I-Band
 D. Z-line
- Q.44 Sarcolemma is the membrane around? (ETEA 2017)
 A. Bone
 B. Joints
 C. Muscle fiber
 D. Heat
- Q.45 Each muscle fiber contains long threads that extend along its entire length. These are called as: (AJK 2019)
 A. Myosin
 B. Microtubules
 C. Microfilaments
 D. Myofibrils
- Q.46 The microtubules in the cytoskeleton are made up of protein: (AJK 2019)
 A. Tropomyosin
 B. Myosin
 C. Tubulin
 D. Actin
- Q.47 The functional unit of a muscle is known as: (AJK 2019)
 A. Sarcomere
 B. Sarcoplasmic reticulum
 C. Sarcoplasm
 D. Sarcolemma
- Q.48 Thin filaments of muscles contain _____ chains of actin molecules. (MDCAT 2019)
 A. Four
 B. Three
 C. One
 D. Two
- Q.49 The thick filaments in a myofibril of muscles are made up of _____. (MDCAT 2019)
 A. Haemoglobin
 B. Actin
 C. Myoglobin
 D. Myosin
- Q.50 What do we call the cell surface membrane of a muscle fiber? (PMC 2020)
 A. Sarcolemma
 B. Sarcoplasm
 C. Plasma membrane
 D. Myofibrils
- Q.51 Globular monomers are present in:
 A. Actin
 B. Myosin
 C. Troponin
 D. Tropomyosin
- Q.52 A muscle protein that has 3 polypeptides:
 A. Actin
 B. Myosin
 C. Troponin
 D. Tropomyosin
- Mechanism of Skeletal Muscle Contraction**
- Q.53 Cross bridges form between:
 A. Troponin and tropomyosin
 B. Actin filaments and myosin heads
 C. Calcium and sodium
 D. Sarcolemma and sarcoplasmic reticulum
- Q.54 When a muscle is at rest, what blocks myosin from binding to actin?
 A. Tropomyosin
 B. Tubulin
 C. Troponin
 D. Sarcomere

- Q.55 All of the following are true regarding muscle contraction except:
 A. I band shortens
 B. A band remains unchanged
 C. Z-lines gets closer
 D. M-line disappears
- Q.56 Contractile protein of skeletal muscle cells involving ATPase activity is:
 A. Actin
 B. Myosin
 C. Troponin
 D. Tropomyosin
- Q.57 Which triggers the release of calcium ions from sarcoplasmic reticulum?
 A. Formation of actin-myosin cross bridges
 B. An action potential
 C. Sarcomere contraction
 D. An increase in calcium ion concentration
- Q.58 According to sliding filament theory, when muscle fibers are stimulated by nervous system, which of the following changes occurs? (MDCAT 2015)
 A. I-bands shorten
 B. Z-lines move further apart
 C. H-zone becomes more visible
 D. A-bands shorten
- Q.59 A motor unit is made up of:
 A. All the muscle fibers within a given muscle
 B. A motor neuron and the muscle fibers it innervates
 C. All the neurons going into an individual section of a body
 D. A fascicle and a nerve
- Q.60 It acts as immediate source of energy for muscles contraction.
 A. ATP
 B. Phosphocreatine
 C. Fatty acids
 D. Glycogen
- Q.61 When muscle contracts, thick and thin filaments undergo:
 A. Overlapping
 B. Shortening
 C. Lengthening
 D. Contraction
- Q.62 The function of calcium ions in muscle contraction is to: (MDCAT 2019)
 A. Bind to troponin molecule and cause them to move
 B. Polarize visible light
 C. Aid in the transmission of nerve impulse
 D. Bind to tropomyosin molecule and cause them to form cross bridges

ANSWER KEY

TOPIC-WISE MCQs PAST PAPER MCQs

1	B	11	C	21	C	31	D	41	D	51	A	61	A
2	C	12	C	22	C	32	C	42	A	52	C	62	A
3	C	13	B	23	C	33	A	43	A	53	B		
4	B	14	C	24	C	34	C	44	C	54	A		
5	A	15	A	25	B	35	C	45	D	55	D		
6	B	16	B	26	C	36	A	46	C	56	B		
7	C	17	C	27	C	37	D	47	A	57	B		
8	D	18	D	28	B	38	A	48	D	58	A		
9	C	19	B	29	A	39	A	49	D	59	B		
10	B	20	B	30	C	40	C	50	A	60	A		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

- Bones have living tissues like osteoblast, osteocytes and osteoclast, while cartilage have chondrocytes that produce large amount of collagenous extracellular matrix.
- Fibrocartilage present in intervertebral disc. Elastic cartilage present in ear pinna and epiglottis. Hyaline cartilage is found at the end of long bones and in the nose, at larynx and trachea.
- Collagen is the most abundant protein in your body. It is the major component of connective tissues that make up several body parts, including tendons, ligaments, skin, and muscles.
- Periosteum is covering around bone while perimysium and perineurium are connective tissue coverings around muscle and nerve fascicles respectively.
- Collagen is the most abundant protein in animal's body. Actin is most abundant in muscles and albumin is most abundant in blood plasma. Titin is present in skeletal muscle cell and it is the largest protein.
- Tibia and fibula are bones of lower legs. They are part of appendicular skeleton.
- Vertebral column is part of axial skeleton. It contains 33 vertebrae and each vertebrae is considered as bone.
- Patella is a knee bone. It is part of appendicular skeleton.
- There are 12 pairs of ribs. 7 pairs are directly attached to sternum (True ribs), 3 pair are attached with sternum via costal arch (false ribs) and 2 pairs are not attached to sternum.
- Skull has two types of regions. One is face and other is skull. Face has 14 bones. 6 are paired and 2 are unpaired.
- Coxal bones are known as hip bones. Each hip bone is formed by ossification of three small bones (ilium, ischium and pubis).
- A hinge joint is a bone joint in which the articular surfaces are molded to each other in such a manner as to permit motion only in one plane. Ball and socket joint shows movement in all directions.
- A synovial joint is the type of joint found between bones that move against each other, such as the joints of the limbs (e.g. shoulder, hip, elbow and knee).

Joint	Examples
Pivot joint	Between proximal end of radius and ulna
Ball and socket	Pelvic and pectoral girdle
Hinge joint	Knee and elbow

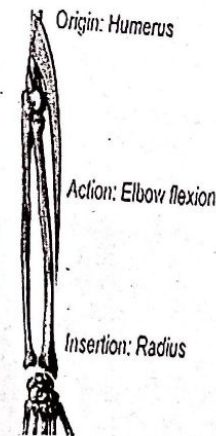
- Joint have three types and one of them is fibrous joints. It is present in different parts of skeleton. One of them is suture (present between skull bones). Saddle, ball and socket and pubic symphysis are different categories of synovial joints.

- There are three types of joints. (i) Fibrous Joints: Present between skull bones, fix teeth into jaws and shaft regions of long arms in fore arm and legs, (ii) Cartilaginous Joints: Present between costal arch and ribs, pubic symphysis and intervertebral disc, iii. Synovial Joints: Present between bones at shoulder, elbow, hip and knee. Bacterial invasions during the arthritis can cause acute forms of inflammation.
- Antibodies attach different parts of body during autoimmune response. Between different types of arthritis, rheumatoid arthritis is an autoimmune disorder.
- Skeletal muscle cells have regular striation, while smooth muscle cells do not have striation. Cardiac muscle cells, however, have irregular striations with involuntary control.

Tendon	Ligament
Inelastic, tough fibrous tissue	Strong, elastic fibrous tissue
Connects bone with muscle	Connects bone with bone (form joint)

- Smooth muscles are found both in invertebrates and vertebrates while cardiac and skeletal muscles are found only in vertebrates and are most developed.

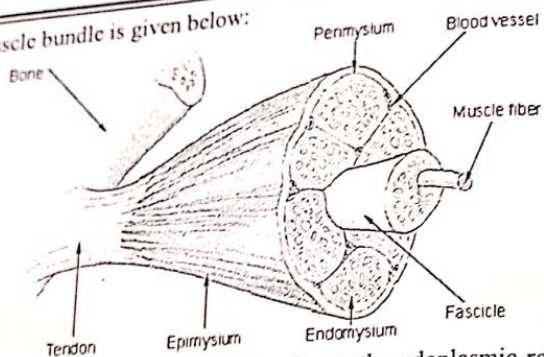
Brachioradialis



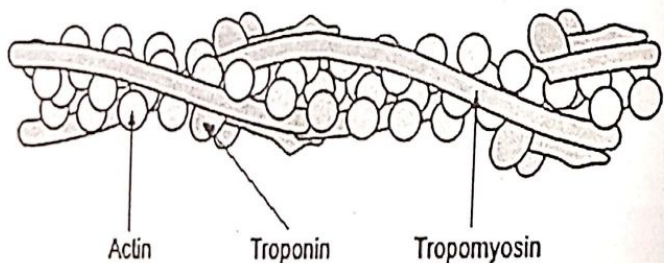
- The main functional partner of bones is skeletal muscles. Both these can work together to bring about movement in the body.
- Cardiac and smooth muscles have irregular striations and no striations respectively. They are involuntary in their action.
- Cardiac and smooth muscles are involuntary in action, while skeletal muscles are voluntary in their functions.
- The muscles of the human heart are stimulated to contract by nerve impulses generated by the Sino Atrial (SA. Node). It is a cluster of cells which are part of the heart muscle. Hence the human heart is myogenic. It does not require nerves to start contracting, it can contract on its own.

PMC Topic-12

27. Anatomy of muscle bundle is given below:

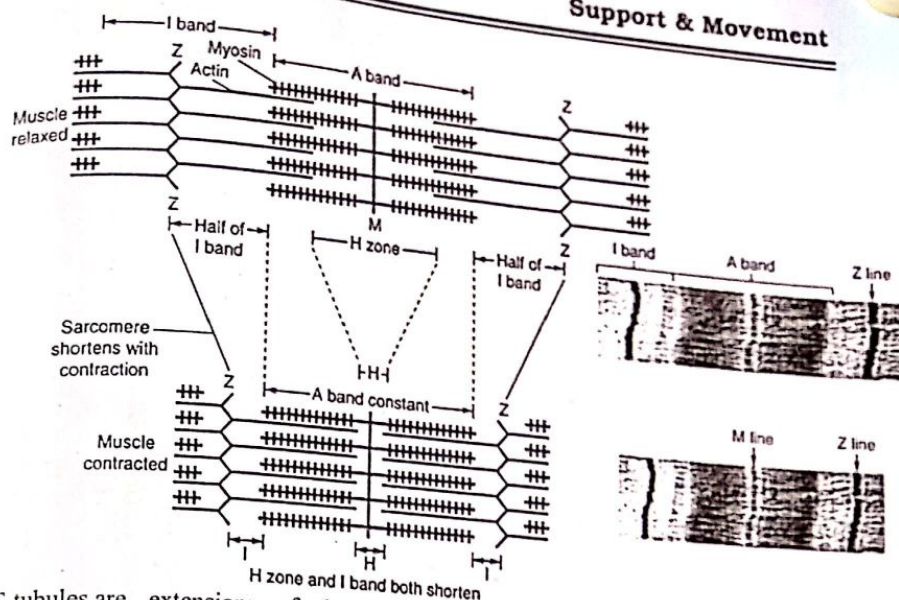


28. Sarcoplasmic reticulum is the modified form of smooth endoplasmic reticulum as they devoid of ribosomes and found in muscles. It regulates Ca^{2+} ions concentration in sarcoplasm.
29. Since sarcolemma is the membrane of muscle cells, so its chemical composition is lipoproteins.
30. A sarcomere is bounded by two Z-lines and its center is bisected by dark line called M line.
31. Each dark band in the skeletal muscles is called A-band because it is anisotropic i.e. it can polarize visible light. This polarization of light is due the presence of myosin. It also contains overlapping actin.
32. T tubule is found at A-I junction in skeletal muscle while at Z-line in cardiac muscle.
33. Diameter of myofibrils is $2\ \mu m$.
34. When viewed in high magnification, each muscle fiber is seen to contain large number of myofibrils $1-2\ \mu m$ in diameter that run in parallel fashion and extend entire length of the cell.
35. Isotropic bands contain only actin-containing thin filaments. They indicate the behavior of polarized light as it passes through I bands. These are with low refractive index thus appears brighter.
36. Most abundant protein in thin filament is actin, while most abundant protein found in thick filaments is myosin.
- 37.

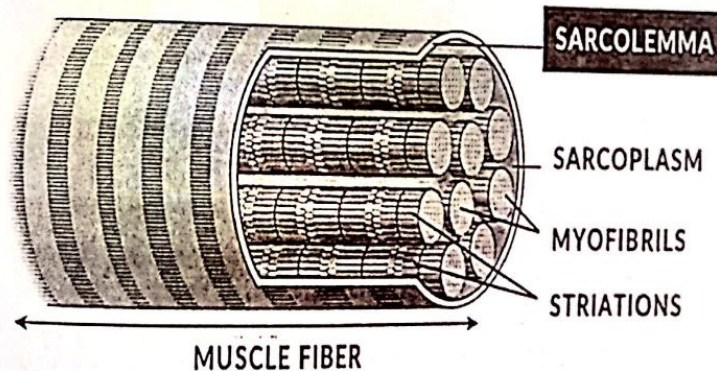


38. The point of attachment of the nerve to the muscle is called neuromuscular junction. All the fibres innervated by a single motor neuron are a motor unit and contract simultaneously in response to action potential fired by motor neurons.
39. A myofibril is a basic rod-like unit of a muscle cell. The repeated protein pattern of myofibrils is called sarcomere and it is the complicated unit of striated muscle tissue. It is the repeating unit between two Z-lines.

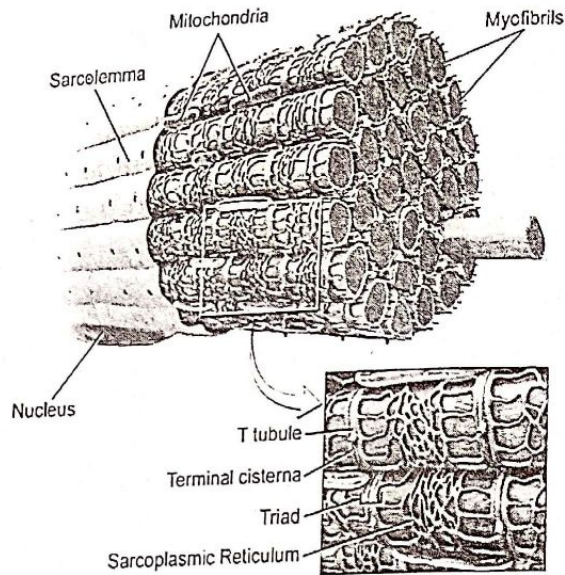
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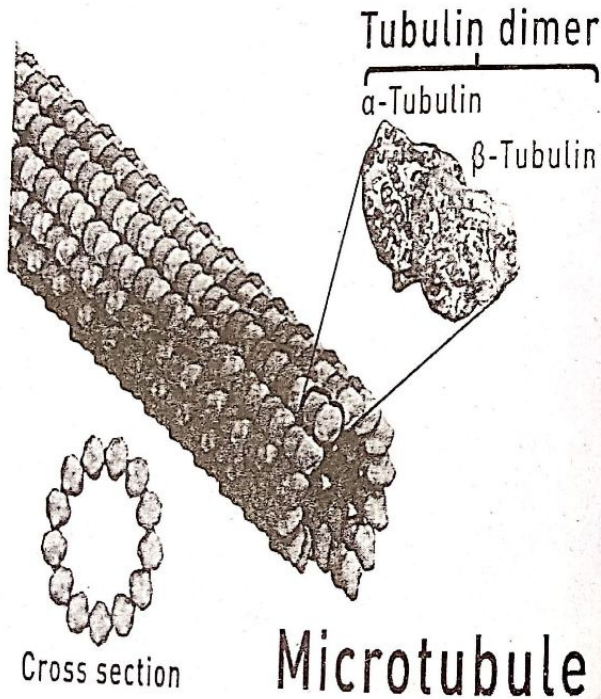
41. T-tubules are extensions of the cell membrane that penetrate into the centre of skeletal and cardiac muscle cells. The function of T-tubules is to conduct impulses from sarcolemma down into the cell and specifically, to another structure in the cell called sarcoplasmic reticulum.
42. The sarcolemma is a specialized cell membrane which surrounds striated muscle fiber cells. The sarcolemma is similar to a typical plasma membrane but has specialized functions for the muscle cell.
43. *Thick filaments* occur only in the A band of a myofibril. The region at which *thick* and *thin filaments* overlap has a *dense* appearance, as there is little space between the *filaments*. *Thin filaments* do not extend all the way into the A bands, leaving a central region of the A band that only contains *thick filaments*.
- 44.



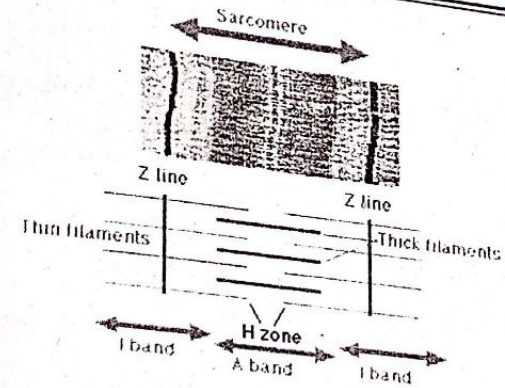
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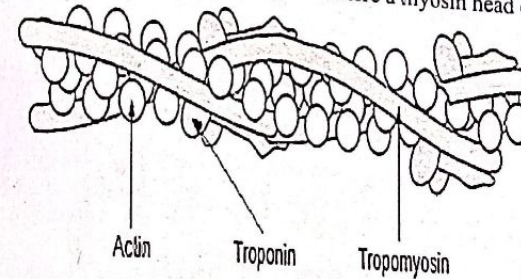
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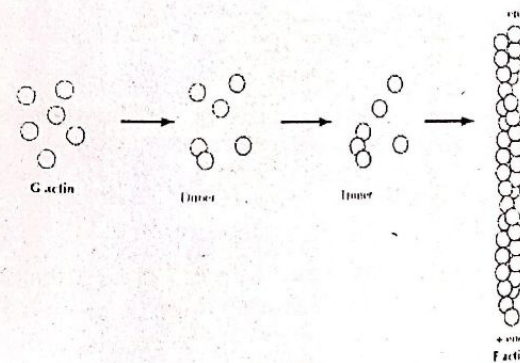
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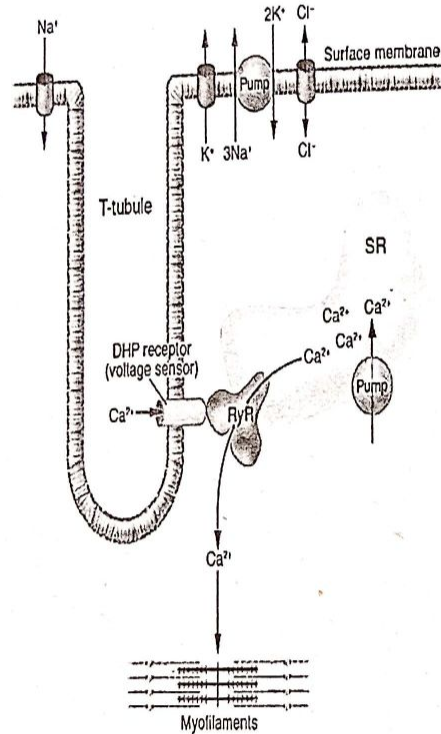
48. Actin is a spherical protein that forms the thin filament in muscle cells. Thin filaments are composed of two long chains of these actin molecules that are twisted around one another. Each actin molecule has a myosin-binding site where a myosin head can bind.



- 49. Thick filaments composed of several hundred molecules of myosin. A myosin molecule is shaped like a golf club, with a tail formed of two intertwined chains and a double globular head projecting from it.
- 50. The sarcolemma, also called as the myolemma, is the cell membrane of a striated muscle fiber cell. It consists of a lipid bilayer and a thin outer coat of polysaccharide material (glycocalyx) that contacts the basement membrane.
- 51. Fibrous actin is formed by combination of smaller globular actin known as G actin.

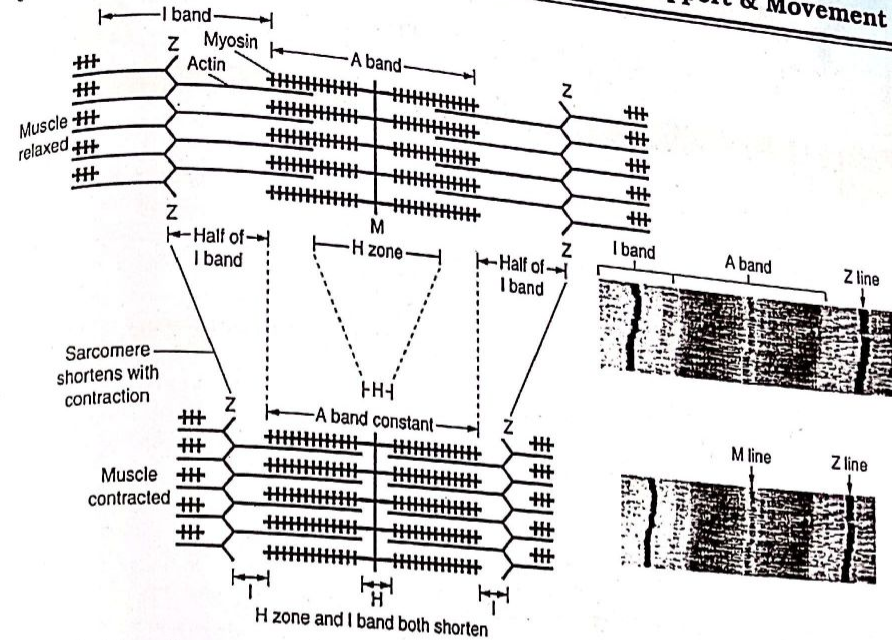


52. Actin has 2 polypeptide chains. Myosin has 6 polypeptides. Tropomyosin has 2 polypeptides. Troponin has 3 chains. (i) **TnI**: Binds with actin, (ii) **TnC**: Binds with calcium, (iii) **TnT**: Binds with tropomyosin.
53. Upon the reception of stimulus, the myosin-binding sites on actin filaments are set free. They myosin head attaches to these binding sites making the cross-bridges.
54. When the muscle is at rest, the tropomyosin is disposed in such a way that it covers the sites on the actin chain where the head of myosin attaches.
55. During muscle contraction, I-band shortens, Z-lines get closer to each other and H-zone disappears. A-band and M-line remain unchanged.
56. In muscle, myosin is found abundantly. Its head region has ATPase activity and involves in ATP hydrolysis during muscle contraction.
- 57.



58. According to sliding filament model of muscle contraction, the following changes can occur
- Z-lines come brought closer together
 - I-band shortens
 - H-zone disappears
59. Muscle contraction is initiated by nerve impulse arriving at the neuromuscular junction. All the fibres innervated by a single motor neuron are a 'motor unit' and contract simultaneously in response to the action potential fired by the motor neurons.
60. ATP is energy currency which radially available for cellular working.

61.



62. Inside the muscle, Ca^{2+} facilitates the interaction between actin and myosin during contractions. Calcium binds with the troponin, causing a position change in tropomyosin, exposing the actin sites that myosin will attach to, for a muscle contraction.

13 VARIATION & GENETICS / INHERITANCE

TOPIC PRACTICE EXERCISE

TOPIC-WISE MCQs

Basic Terms

- Q.1 The alleles are:
 A. A pair of genes governing a specific character
 B. Genes governing eye characters
 C. Multiple forms of genes
 D. Genes present on Allosomes
- Q.2 An organism's genetic constitution is called its:
 A. Genotype
 B. Genetics
 C. Phenotype
 D. Gene pool
- Q.3 All the genes/alleles found in a breeding population at a given time are collectively termed as:
 A. Genome
 B. Gene pool
 C. Genotype
 D. Karyotype
- Q.4 An allele is said to be dominant if:
 A. It is expressed only in heterozygous combination
 B. It is expressed only in homozygous combination
 C. It is expressed in both homozygous and heterozygous condition
 D. It is expressed only in second generation
- Q.5 An organism with two identical alleles for a given trait is:
 A. Homozygous
 B. Dominant
 C. Heterozygous
 D. Hermaphrodite
- Q.6 Position of a gene within a DNA molecule is:
 A. Locus
 B. Amplicon
 C. Origin
 D. Filial (MDCAT 2014)
- Q.7 The total number of genes in a population is called:
 A. Gene pool
 B. Genome
 C. Allele pool
 D. Genomic library (MDCAT 2016)
- Q.8 Locus stands for:
 A. Position of gene on homologous chromosomes
 B. Regions of chromosomes
 C. Position of an allele within a DNA molecule
 D. Close regions of same chromosomes (MDCAT 2017)
- Q.9 The region of the chromosome or more specifically, a length of the DNA molecule, which has a particular nucleotides sequence that codes for specific protein, is called _____
 A. Locus
 B. Allele
 C. Gene
 D. Kinetochores (MDCAT 2018)
- Q.10 _____ is the exact position of a gene on the chromosome. (MDCAT 2018)
 A. Genotype
 B. Centromere
 C. Locus
 D. Trait
- Q.11 Homozygous means:
 A. Having two identical alleles of a gene
 B. Alleles in an organism
 C. Having two identical genes
 D. Two different alleles of a gene (MDCAT 2019)

PMC Topic-13

Variation & Genetics/Inheritance

- Q.12 In genetics, the term locus refers to the _____ of the gene on the chromosome. (MDCAT 2019)
 A. Frequency
 B. Position
 C. Copy
 D. Inversion
- Q.13 When both the alleles of a gene pair are same, the organism is said to be: (PMC 2020)
 A. Heterozygous
 B. Homozygous
 C. Genotype
 D. Phenotype
- Q.14 Phenotype is: (PMC 2020)
 A. The genetic complement i.e. the genes in an individual for a particular trait
 B. Partner of gene pair
 C. The form of appearance of a trait
 D. The position of a gene on the chromosome

Mendelian Inheritance

- Q.15 In Mendel's experiment, nature of seed coat, flower colour, position of flower, pod colour, stem height, etc., are referred as:
 A. Alleles
 B. Phenotypes
 C. Genotypes
 D. Karyotype
- Q.16 Mendel concluded that each organism has two hereditary factors for each trait, now called:
 A. Chromatids
 B. Alleles (SMBBMC 2015)
 C. Chromosomes
 D. None of the above
- Q.17 How many pairs of homologous chromosomes are present in *Pisum sativum*? (ETEA 2019)
 A. Seven pairs
 B. Eight pairs
 C. Nine pairs
 D. Ten pairs

Law of Segregation/Inheritance of Single Trait

- Q.18 The dwarfness in plants of F₂ generation is due to:
 A. Homozygous recessive alleles
 B. Homozygous dominant alleles
 C. Heterozygous dominant alleles
 D. Heterozygous recessive alleles
- Q.19 In Mendel's experiments, the phenotypic ratio of recessive to dominant plants was equal to:
 A. 1:3
 B. 3:9
 C. 3:1
 D. 9:3
- Q.20 A cross between a homozygous recessive and a heterozygous plant is called:
 A. Monohybrid cross
 B. Test cross
 C. Dihybrid cross
 D. Back cross
- Q.21 Self-cross between Tt and Tt plants results into the genotype ratio of:
 A. 3:1
 B. 1:3
 C. 1:2:1
 D. 4:0
- Q.22 Self-fertilization of F₁ dihybrids, following independent assortment of alleles will result in: (MDCAT 2017)
 A. 3/16 tall, round: 3/16 dwarf, wrinkled
 B. 9/16 tall, round: 1/16 dwarf, round
 C. 9/16 tall, wrinkled: 3/16 dwarf, round
 D. 3/16 tall, wrinkled: 3/16 dwarf, round

PMC Topic-13

Law of Independent Assortment/Inheritance of Two Traits

- Q.23 In Mendelism, the linkage was not observed due to:
 A. Mutation
 B. Synapsis
 C. Independent assortment
 D. Crossing over
- Q.24 A cross between plants having RRY^y and rry^y composition will yield plants with:
 A. Round and yellow seeds
 B. Wrinkled and yellow seeds
 C. Round and green seeds
 D. Wrinkled and green seeds
- Q.25 When a tall plant with rounded seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr), then the generation consists of tall plants with rounded seeds. How many types of gametes a plant would produce?
 A. One
 B. Four
 C. Three
 D. Eight
- Q.26 In Mendelian dihybrid cross, how many of progeny in F₂ generation possess genotype rryy?
 A. $\frac{1}{16}$
 B. $\frac{3}{16}$
 C. $\frac{2}{16}$
 D. $\frac{4}{16}$
- Q.27 In the dihybrid cross, the number of round green seeds that were homozygous for round trait:
 A. 2
 B. 1
 C. 3
 D. 4

Dominance Relations

- Q.28 As a result of cross-fertilization of true breeding pea plant having purple colored flowers with that of white colored flowers, the offspring will have flower with:
 (MDCAT 2017)

- A. $\frac{1}{4}$ purple and $\frac{3}{4}$ white
 B. All white
 C. $\frac{1}{4}$ white and $\frac{3}{4}$ purple
 D. All purple

- Q.29 Incomplete dominance: (PMC 2020)

- A. Different alleles of a gene are both expressed in heterozygous condition
 B. One allele is completely dominant over the other and the presence of the recessive allele is functionally hidden so the heterozygote has the same round phenotype as homozygote.
 C. The phenotype of the heterozygote is intermediate between phenotypes of the two homozygotes.
 D. Gene mutations may produce many different alleles of a gene.

Multiple Alleles and ABO Blood Group System

- Q.30 Alleles from a gene arise by:
 A. Genetic drift
 B. Natural selection
 C. Mutation
 D. Non-random mating
- Q.31 Inheritance of ABO blood group system is an example of:
 A. Multiple allelism
 B. Co-dominance
 C. Complete dominance
 D. Gene linkage

PMC Topic-13

- Q.32 Multiple alleles are the altered forms of a gene whose number is more than two and may have as many as 300 alleles, but a diploid organism can:
 A. Have just one of them in its genome
 B. Have four of them in its genome
 C. Have two of them in its genome
 D. Have multiple of them in its genome
- Q.33 In humans, the polymorphic gene 'I' has three multiple alleles which are the result of:
 A. Complete dominance
 B. Mutation
 C. Sex linkage
 D. Gene linkage
- Q.34 The genotype of blood group 'A' can be:
 A. I^AI^A
 B. I^AI^A or I^Ai
 C. I^BI^B
 D. I^Ai
- Q.35 A person with antigens 'B' present of membrane of RBCs and 'anti-A' antibodies in the blood plasma will have:
 A. Blood group 'A'
 B. Blood group 'AB'
 C. Blood group 'B'
 D. Blood group 'O'
- Q.36 If a female has 'A' blood group and her husband has 'O' blood group, then the blood group of their children would possibly be:
 A. A and B groups only
 B. A and O groups only
 C. AB only
 D. All four groups
- Q.37 ABO blood grouping is controlled by gene I which has three alleles and show co-dominance. There are six genotypes. How many phenotypes are possible?
 A. Six
 B. Four
 C. Three
 D. Five
- Q.38 Which of the following blood groups is not possible in a person whose father is of blood group O?
 A. AB
 B. B
 C. A
 D. O
- Q.39 A man having a blood group O marries a woman having a blood group A whose father was also O. What is the probability of 'O' in their offspring?
 A. 50%
 B. 75%
 C. 25%
 D. 0%
- Q.40 Which of the following blood group is considered as universal donor?
 A. AB^{+ve}
 B. O^{-ve}
 C. AB^{-ve}
 D. O^{+ve}
- Q.41 Blood group antigens can be found in:
 A. R.B.Cs
 B. Body fluids
 C. Saliva
 D. All A, B, C
- Q.42 ABO blood system is an example of: (MDCAT 2015)
 A. Polygenes
 B. Multiple alleles
 C. Multiple genes
 D. Multiple mutation
- Q.43 Which one of the following is multiple allelic character? (MDCAT 2018)
 A. Length of stem in pea plant
 B. Blood group of the human being
 C. Shape of seed in pea plant
 D. Colour of flower in pea plant
- Q.44 If Sara has blood group O. The genotype of her mother and father is possibly: (AJK 2019)
 A. Bi X BB
 B. BB X BB
 C. Bi X Bi
 D. BB X Bi

Rh Blood Group System and Erythroblastosis Foetalis

- Q.45 Rh factor is named after:
 A. Man
 B. Monkey
 C. Rat
 D. Chimpanzee
- Q.46 Which of the following is genetically dominant in man?
 A. Colour blindness
 B. Haemophilia
 C. Rh positive
 D. Albinism
- Q.47 Rh factor may be responsible for:
 A. Turner's syndrome
 B. Sickle-cell anaemia
 C. AIDS
 D. Erythroblastosis foetalis
- Q.48 A character determined by three alleles is:
 A. Human skin color
 B. Human eye color
 C. Human blood group
 D. Human Rh factor
- Q.49 Relationships between alleles of ABO blood group system can be explained by:
 A. Complete dominance and Co dominance
 B. Incomplete dominance and Co dominance
 C. Over dominance and Incomplete dominance
 D. Complete dominance only
- Q.50 ABO blood group system was discovered by:
 A. Bernstein
 B. Landsteiner
 C. Karl Correns
 D. Johannsen
- Q.51 Genotype for AB⁻ blood group:
 A. I^AI^Bdd
 B. I^AI^BDD
 C. I^AI^BDd
 D. I^AI^Add
- Gene Linkage, Crossing Over and Recombination Frequency**
- Q.52 Which of the following will not result in variations among siblings?
 A. Independent assortment of genes
 B. Linkage
 C. Crossing over
 D. Mutation
- Q.53 If all four phenotypic combinations are (parental and recombinants) are produced in equal ration 1:1:1:1 then there would be:
 A. No linkage between genes
 B. Partial linkage between genes
 C. Complete linkage between genes
 D. Tight linkage between genes
- Q.54 All of the following can form a linkage group on human chromosome 11 except:
 A. Gout
 B. Albinism
 C. Sickle cell anemia
 D. Leukemia
- Q.55 The recombination frequency is 20% between the two genes. The distance between them in unit map is:
 A. 20
 B. 60
 C. 30
 D. 80
- Q.56 Genes A, B, C, and D are located on the same chromosome. The recombination frequencies (RF) are as follows:
 What is the most likely order of the genes on the chromosome?
 A. BCAD
 B. CBAD
 C. ACBD
 D. ABCD

- Q.57 Number of pairs of autosomes in humans is:
 A. 23
 B. 21
 C. 24
 D. 22
- Q.58 There are _____ linkage groups in human.
 A. 22
 B. 46
 C. 23
 D. 80
- Q.59 Chance of a cross over between two loci is directly proportional to their:
 A. Length
 B. Width
 C. Distance
 D. Thickness
- Q.60 A person was married to his cousin and both are heterozygous for sickle cell anemia. Among their four kids, what will be proportion of affected homozygotes?
 A. 50%
 B. 75%
 C. 25%
 D. 100%
- Q.61 In which situation, genes are not assorted independently during meiosis in a chromosome?
 A. When genes are not linked and their loci are far apart
 B. When there are too many genes on a chromosome
 C. When some genes have mutated on the chromosome
 D. When genes are linked and their loci are close to each other
- Q.62 Which situation can reduce the chances of variation and genetic recombination?
 A. Random fusion of gametes
 B. Crossing over
 C. Gene linkage
 D. Mutation
- Q.63 During crossing over, exchange of segments takes place between:
 A. Sister chromatids of homologous chromosomes
 B. Non-sister chromatids of homologous chromosomes
 C. Non-sister chromatids of non-homologous chromosomes
 D. Sister chromatids of non-homologous chromosome
- Sex Linkage in Drosophila**
- Q.64 *Drosophila* has four pairs of chromosomes. How many linkage groups does it have?
 A. Eight
 B. One less than the pairs of chromosomes
 C. Four
 D. One more than the pairs of chromosomes
- Q.65 Genes are present on chromosomes. This was experimentally proved by:
 A. Sutton
 B. Fleming
 C. Morgan
 D. Landsteiner
- Sex Linkage in Humans (Hemophilia & Color Blindness)**
- Q.66 Which of the following is not a genetic disorder?
 A. Hemophilia
 B. Colour blindness
 C. Phenylketonuria
 D. Epilepsy
- Q.67 Example of X-linked dominant trait is:
 A. Hemophilia A
 B. Tritanopia
 C. Hemophilia B
 D. Hypophosphatemia

- Q.68 All of the following are non-allelic X-linked traits except:
 A. Hemophilia A
 B. Hemophilia C
 C. Hemophilia B
 D. TFM syndrome
- Q.69 Which is not related to color blindness?
 A. Zigzag pattern of inheritance
 B. Passes directly from father to son
 C. Rhodopsin
 D. More common in men
- Q.70 Regarding color blindness when a normal male marries a carrier female, which is the correct statement?
 A. All daughters will be color blind
 B. All daughters will be carriers
 C. All sons will be color blind
 D. Half of the sons will be color blind
- Q.71 What is the probability of a hemophilic daughter of a normal man whose father was hemophilic and a carrier woman?
 A. 0%
 B. 50%
 C. 25%
 D. 75%
- Q.72 X-linked recessive trait is:
 A. Hypophosphatemia
 B. Haemophilia
 C. Vitamin-D resistant rickets
 D. Diabetes mellitus
- Q.73 Which one of the following is X-linked trait?
 A. Male pattern baldness
 B. Haemophilia
 C. Diabetes mellitus
 D. Erythroblastosis foetalis
- Q.74 The gene for red-green color blindness is present on:
 A. Y-chromosome
 B. Autosome No. 7
 C. X-chromosome
 D. Autosome No.9
- Q.75 If a carrier haemophilic female ($X^{H}X^{h}$) is married to a haemophilic male ($X^{h}Y$). What will be the ratio of presence of haemophilia in the children? (MDCAT 2019)
 A. 100% all females and males will be haemophiliac
 B. Carrier female 25% haemophilic female 25%, 25% normal male and 25% haemophilic male
 C. Females and males both have 50% chances to getting haemophilia
 D. Females have 50% chances of getting haemophilia and females will be 100% haemophilic.
- Q.76 Hemophilia is a sex linked _____ trait.
 A. Dominant
 B. Codominant
 C. Pleiotropic
 D. Recessive
- Q.77 Haemophilia A and B, color blindness and testicular feminization are example of:
 A. X linked dominant traits
 B. Y linked inheritance
 C. X linked recessive traits
 D. Pseudoautosomal traits
- Q.78 Which traits are most likely to affect men than women? (PMC 2020)
 A. X - linked recessive
 B. Autosomal dominant
 C. X - linked dominant
 D. Autosomal recessive
- Q.79 Homozygous recessive allelic condition for green opsins indicate:
 A. Monochromacy
 B. Protanopia
 C. Tritanopia
 D. Deuteranopia
- Q.80 An X linked trait that results due to hormonal insensitivity of target cells:
 A. Gout
 B. Duchene muscular dystrophy
 C. Testicular feminization syndrome
 D. Color blindness
- Q.81 Gene responsible for webbing of toes is present on:
 A. X chromosome
 B. Y chromosome
 C. Chromosome 11
 D. Chromosome 13

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER

1	C	11	A	21	C	31	A	41	D	51	A	61	D	71	A	81	B		
2	A	12	B	22	D	32	C	42	B	52	D	62	C	72	B				
3	B	13	B	23	C	33	B	43	B	53	A	63	B	73	B				
4	C	14	C	24	A	34	B	44	C	54	A	64	C	74	C				
5	A	15	B	25	A	35	C	45	B	55	A	65	C	75	B				
6	A	16	B	26	A	36	B	46	C	56	B	66	D	76	D				
7	A	17	A	27	B	37	B	47	B	57	D	67	D	76	C				
8	A	18	A	28	D	38	A	48	B	58	C	68	B	78	A				
9	C	19	A	29	C	39	A	49	A	59	C	69	B	79	D				
10	C	20	B	30	C	40	B	50	B	60	C	70	D	80	C				

(MDCAT 2015)

(MDCAT 2016)

(MDCAT 2017)

(MDCAT 2019)

(PMC 2020)

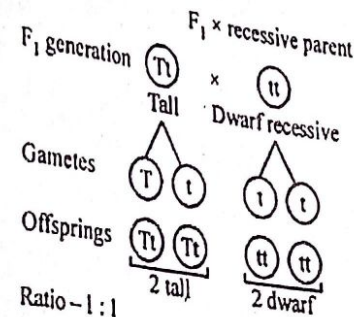
(PMC 2020)

EXPLANATORY NOTES

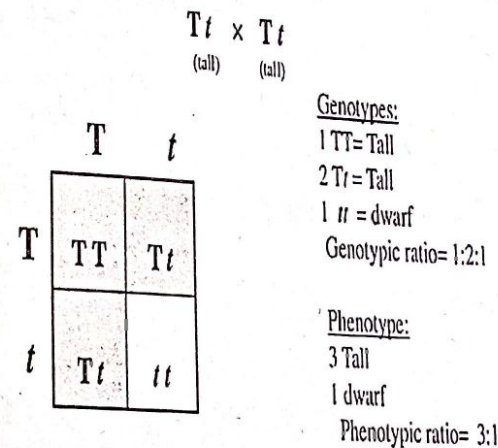
TOPIC-WISE MCQS & PAST PAPER MCQS

- Partner of a gene pair is known as allele.
- Genotype is a genetic makeup of organism that controls the expression of a certain trait.
- The total aggregate of genes in a population at any given time is called the population's gene pool. It consists of all the alleles at all genes loci in all individuals of the population.
- Such an allele that masks the effect of other allele in a pair is called dominant allele and such trait is dominant.
- When both alleles of a gene pair in an organism are same, the organism is homozygous for that gene pair. If both alleles of a gene pair are different, the condition is called heterozygous. If both male and female sex organs are present in body of same organism, the condition is called as hermaphrodite.
- The position of a gene on the chromosome is called its locus.
- The total aggregate of genes in a population at any given time is called the population's gene pool. It consists of all the alleles at all genes loci in all individuals of the population. Genome is the collection of all the genes present in an individual.
- The position of a gene on the chromosome is called its locus.
- Genes are actually parts of DNA comprising its basic sequence.
- The position of a gene on the chromosome is called its locus.
- When both alleles of a gene pair in an organism are same, the organism is homozygous for that gene pair.
- The position of a gene on the chromosome is called its locus.
- Heterozygous:** Heterozygous is a state of having inherited different forms of a particular gene from each one of your biological parents
Homozygous: Homozygous describes the genetic condition or the genetic state where an individual has inherited the same DNA sequence for a particular gene from both their biological mother and their biological father.
Genotype: In a broad sense, the term "genotype" refers to the genetic makeup of an organism.
Phenotype: The term "phenotype" refers to the observable physical properties of an organism.
- Phenotype:** The term "phenotype" refers to the observable physical properties of an organism.
- Physical appearance of a trait is called phenotype. For example, round and wrinkled are phenotypes of seed shape as the shape is a trait.
- According to Mendel particular hereditary factors that carry specific character from parents to offsprings are called as Elementen.
- Total number of chromosomes in *Pisum sativum* (pea plant) are 14.
- The trait whose effect has been masked in F₁ generation but it reappears in F₂ generation is recessive.
- In monohybrid cross the phenotypic ratio between recessive and dominant plants during F₂ generation is 1:3.

20.



21.



22.

Event No.1	Event No.2	Both Events at a Time
Seed Shape	Seed Colour	Seed Shape & Colour
Independent Probability	Independent Probability	Joint Probability
Round = 3/4	Tall = 3/4	Round tall = 3/4 × 3/4 = 9/16
Round = 3/4	dwarf = 1/4	Round dwarf = 3/4 × 1/4 = 3/16
Wrinkled = 1/4	Tall = 3/4	Wrinkled Tall = 1/4 × 3/4 = 3/16
Wrinkled = 1/4	dwarf = 1/4	Wrinkled dwarf = 1/4 × 1/4 = 1/16

- Gene linkage does not obey Mendel law of independent assortment.
- (RR) phenotype is dominant over wrinkle (rr) and yellow (YY) is dominant over green (yy). In F₁ generation all plants will be round and yellow seeded.
- When a tall plant with rounded seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr), then the generation consists of tall plants with rounded seeds, all plants will have TtRr genotype.

26.

	R ^Y	R ^y	r ^Y	r ^y
R ^Y	RRYY	RRYy	RrYY	RrYy
R ^y	RRYy	RRyy	RrYy	Rryy
r ^Y	RrYY	RrYy	rrYY	rrYy
r ^y	RrYy	Rryy	rrYy	rryy

27. There is only single plant showing RRyy genotype in F₂ generation of dihybrid cross.
28. Purple colour flowers are dominant over white colour plants.
29. Incomplete dominance is when one allele does not completely mask the effects of the other allele for the trait in heterozygous condition, and the organism's resulting physical appearance shows a blending of both alleles.
30. Mutation can produce alternative forms of a gene, whose number is more than two are called multiple alleles.
31. All such altered alternative forms of a gene, whose number is more than two are called multiple alleles.
32. Any two of these multiple alleles can be present in the genome of a diploid organism, but a haploid organism or a gamete has just one of them in its genome.
33. Gene mutations may produce many different alleles of a gene.
- 34.

Phenotype	Genotype	Antigen	Antibody
A	I ^A I ^A , I ^A i	A	Anti-B antibody
B	I ^B I ^B , I ^B i	B	Anti-A antibody
AB	I ^A I ^B	A & B	No Antibody
O	ii	No	Anti-A antibody Anti-B antibody

35.

Phenotype	Genotype	Antigen	Antibody
A	I ^A I ^A , I ^A i	A	Anti-B antibody
B	I ^B I ^B , I ^B i	B	Anti-A antibody
AB	I ^A I ^B	A & B	No Antibody
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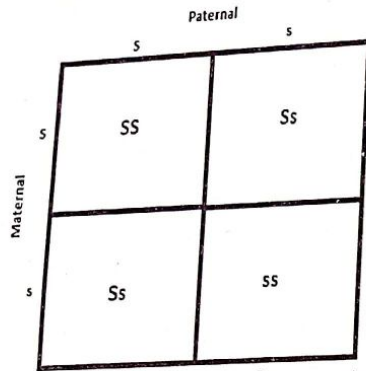
36. Female has I^AI^A or I^Ai and male is ii, same conditions will be in offsprings.
37. ABO blood group shows four different phenotypes, A, B, AB, and O.
38. Father's genotype is ii so the blood group of offspring can't be AB.
39. Male has "ii" genotype and female is "I^Ai", there are 50% chances for the child with O blood group.
40. Blood group from ABO blood group system without any antigen can be donated to any other blood.
41. Blood group antigens can be found in RBCs, body fluids and saliva.
42. ABO blood group is first discovered multiple allelic blood group system in man.
43. ABO blood group is first discovered multiple allelic blood group system in man.
44. To give birth to an O blood group type child, parents should have A or B blood group in heterozygous form.

45. The Rh blood group is one of the most complex blood groups known in humans. From its discovery 60 years ago where it was named after the Rhesus monkey, it has become second in importance only to the ABO blood group in the field of transfusion medicine.
46. Colour Blindness and Haemophilia are X linked recessive traits while Albinism is autosomal recessive; lastly Rh factor is X linked recessive trait while Albinism is autosomal dominant trait.
47. Erythroblastosis fetalis is hemolytic anemia in the fetus caused by transplacental transmission of maternal antibodies to fetal red blood cells. The disorder usually results from incompatibility between maternal and fetal blood groups.
48. ABO blood group is first discovered multiple allelic blood group system in man. This blood group system is encoded by a single polymorphic gene I on chromosome 9. It has three multiple alleles I^A, I^B and i.
49. Alleles for blood groups A and B are dominant over allele for blood group O but are codominant to each other.
50. Karl Landsteiner discovered ABO blood group system and its genetics were explained by Bernstein.
51. A person with AB blood group has genotype of I^AI^B. Gene responsible for presence of Rh factor is designated as D. It can be present as DD or Dd, both of which means presence of Rh factor. dd means absence of Rh factor.
52. Gene linkage minimizes the chances of genetic recombination and variation among offspring while independent assortment and crossing over enhances it.
53. Appearance of recombinants in equal proportions to their parents in next generation indicates that two genes are present farther from each other.
54. Genes for colour blindness, haemophilia, gout etc. form one linkage group on human X chromosome.
55. The recombination frequency is 20% between the two genes. The distance between them in unit map is 20.
- 56.

Relationship	RF
A-B	8%
A-C	23%
A-D	19%
B-C	10%
C-D	52%

57. A pair of genes with a larger recombination frequency are likely farther apart, while a pair with a smaller recombination frequency are likely to be closer together. Therefore, we should start with the largest recombination frequency (RF) of two genes. In this case, C and D are the farthest apart, so A and B must be between them.
58. 22 pairs of chromosomes are autosomes in human. One pair is of sex chromosomes.
59. Number of linkage group is equal to number of homologous chromosomes in a cell. There are 23 linkage groups in human cell.
60. The value of Cross over or recombination frequency is directly proportional to distance between the genes on gene map.

61.

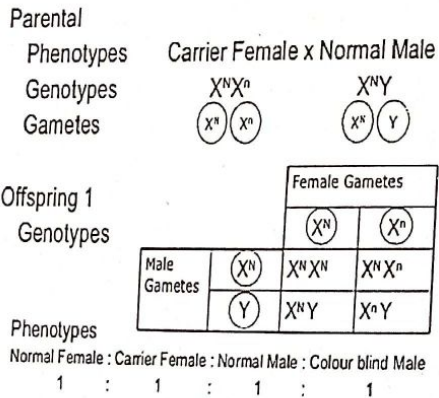


SICKLE CELL DISEASE
Recessive

Each child's chances are:

- 25% of not having the disease (SS)
- 25% of having the disease (ss)
- 50% of carrying the disease

- Linked genes do not obey law of independent assortment.
- Gene linkage does not obey Mendel law of independent assortment.
- Number of linkage groups in an organism is equal to number of chromosomal pairs.
- Before Morgan there was speculation about role of chromosomes in inheritance but no one had proved it experimentally. Morgan performed experiments on fruit fly and he concluded that eye color in *Drosophila* resides on X chromosome. This shows that genes for all traits are present on different chromosomes.
- Hemophilia, colorblindness and Phenylketonuria diseases are genetic disorders.
- Testicular feminization syndrome is a rare X-linked recessive trait. Similarly, Haemophilia is also X-linked recessive.
- Haemophilia A and B are non-allelic recessive sex-linked but hemophilia C is an autosomal recessive trait (Autosome 4).
- Like any sex-linked recessive traits, colorblindness also moves zigzags from maternal grandfather through a carrier daughter to a grandson.



- Female can be carrier but phenotypically will be normal.
- Haemophilia and colour blindness are X-linked recessive traits.
- Haemophilia and colour blindness are X-linked recessive traits.
- The genes for red and green opsins are on X chromosome while the gene for blue opsin is present on autosome 7.

75.

Gender	Genotype	Phenotype
Female	$X^H X^H$	Normal
	$X^H X^h$	Normal but Carrier
	$X^h X^h$	Haemophilic
Male	$X^H Y$	Normal
	$X^h Y$	Haemophilic

- Gene for hemophilia is linked with X-chromosome in recessive form.
- Haemophilia A and B, color blindness are the example of X-Linked recessive Traits.
- X-Linked recessive traits affect male more as compared to female and vice versa for X-linked dominant traits.
- Protanopia is red color blindness
- Deuteranopia is green color blindness
- Tritanopia is blue color blindness
- Tfm gene encodes a receptor for a hormone known as androgen. Androgens are unable to bind to receptors when mutated tfm gene fails to code for receptor.
- Y linked traits are known as holandric traits. A few characters are Y linked and these are discovered on Y chromosome such as testes determining factor and minor histocompatibility

1 UNIT

CELL STRUCTURE AND FUNCTION

SELF ASSESSMENT TEST

Q.1 Cell theory was formulated by Schleiden (1838) and Schwann (1839) which was later modified by:

- A. Robert Whittaker
 B. Madam Curie
 C. Rudolf Virchow
 D. Anton von Leeuwenhoek

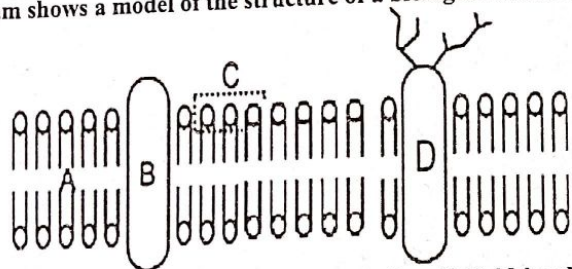
Q.2 Keeping in view the fluid mosaic model for the structure of cell membrane, which one of the following statements is correct concerning the movement of lipids and proteins from one lipid monolayer to the other described as flip-flop movement:

- A. Both lipids and proteins can flip-flop
 B. Lipid can rarely flip-flop, proteins cannot
 C. Proteins can flip-flop, lipids can not
 D. Neither lipids nor proteins can flip-flop

Q.3 Some cellular organelles are bounded by a single membrane, while others have two membranes around them. Which one of the following is correct?

	Single membrane		Two membranes	
A.	Vacuole	Lysosome	Nucleus	Chloroplast
B.	Chloroplast	Lysosome	Nucleus	Vacuole
C.	Nucleus	Chloroplast	Lysosome	Vacuole
D.	Nucleus	Lysosome	Chloroplast	Vacuole

Q.4 The diagram shows a model of the structure of a biological membrane:



Which labeled part would restrict the movement of small, lipid-insoluble molecules?

Q.5 Cells without nucleoli die because they do not possess:

- A. Centrioles, and are unable to undergo cell division
 B. Lysosomes, and are unable to destroy worn-out organelles
 C. Mitochondria, and are unable to obtain energy
 D. Ribosomes, and are unable to manufacture proteins

Q.6 How many units occur in each stockpile of Golgi apparatus?

- A. 4 to 8
 B. 4 to 6
 C. 2 to 6
 D. 2 to 8

Q.7 It is synthesized by free-floating ribosomes of cytoplasm in humans:

- A. Pancreatic lipase
 B. Salivary amylase
 C. Insulin
 D. DNA helicase

Q.8 These play a vital role in the defense activity of macrophages:

- A. Mitochondria
 B. Lysosomes
 C. Lysozymes
 D. Ribosomes

KIPS Unit-1

Cell Structure & Function

Q.9 Damage to one of the following immediately kills the cell whether it's prokaryotic or eukaryotic:

- A. Mitochondria
 C. Cell wall

- B. Cell membrane
 D. Golgi apparatus

Q.10 Movement of Na^+ across axon membrane via $\text{Na}^+\text{-K}^+$ pump is an example of:

- A. Active transport
 C. Passive transport

- B. Diffusion
 D. Osmosis

Q.11 Which one always passes through the nuclear membrane from nucleoplasm to the cytoplasm?

- A. Proteins
 C. Enzymes

- B. DNA nucleotides
 D. RNA

Q.12 Cytoplasmic streaming movement causes the flow of all except:

- A. Endoplasmic reticulum
 C. Mitochondria

- B. Lysosomes
 D. Glucose and salts

Q.13 They help to detoxify the harmful drugs:

- A. Ribosomes
 C. RER

- B. SER
 D. Golgi bodies

Q.14 It is mismatched concerning mitochondrial membrane:

- A. Outer membrane-Smooth
 C. Outer membrane-Chemosmosis

- B. Inner membrane- F_1 particles
 D. Inner membrane-Increases surface area

Q.15 Types of ribosome present in the cytosol and organelles of the eukaryotic cell are respectively:

- A. the 60S and 40S
 C. the 70S and 80S

- B. the 80S and 70S
 D. the 80S and 80S

Q.16 Which of the following cell types would you expect to be abundant with endoplasmic reticulum and Golgi bodies?

- I. Plasma B cells (produce antibodies)
 II. Adipose cells (store fats)
 III. Islet of Langerhans cells (secrete insulin)
 IV. Red blood cells (transport oxygen)

- A. I and II only
 C. III and IV only

- B. I and III only
 D. II and III only

Q.17 Which of the following is a protective structure in bacterial cells?

- A. Cell wall
 C. Cellulose

- B. Protoplasm
 D. Nuclei

Q.18 Which one is always unicellular?

- A. *Mycoplasma*
 C. Virus

- B. Protists
 D. Algae

Q.19 Transport of glucose into the cell with the help of insulin is an example of:

- A. Osmosis
 C. Active transport

- B. Facilitated diffusion
 D. Endocytosis

Q.20 Select the incorrect pair from the following:

- A. Leucoplast-Carotene
 C. Amyloplast-Starch

- B. Elaioplast-Oils
 D. Aleuroplasts-Proteins

Q.21 The functional units of Golgi apparatus are:

- A. Thylakoids
 C. Oxysomes

- B. Cristae
 D. Cisternae

KIPS Unit-1

- Q.22 The outer and inner membranes of mitochondria are:
 A. Structurally and functionally similar
 B. Structurally similar but functionally different
 C. Structurally and functionally different
 D. Structurally different but functionally similar
- Q.23 Which substances can cross the plasma membrane more easily?
 A. Ions
 B. Lipid soluble
 C. Proteins
 D. Starch
- Q.24 The ratio of RNA and protein in a ribosome is:
 A. 1:1
 B. 4:7
 C. 2:3
 D. 3:1
- Q.25 Secretory granules bud off from:
 A. Golgi bodies
 B. Vacuoles
 C. SER
 D. Nucleus
- Q.26 What is Polysome?
 A. Group of mRNAs and one ribosome
 B. Many ribosomes and many mRNAs
 C. mRNA + rRNA + tRNA + ribosome
 D. One mRNA and many ribosomes
- Q.27 Which one is a self-replicating organelle?
 A. Ribosome
 B. Centriole
 C. Lysosome
 D. Mitochondrion
- Q.28 The replica of the chromosome is:
 A. Centromere
 B. Chromatid
 C. Kinetochore
 D. Nucleosomes
- Q.29 All of the following are single membranous organelles except:
 A. Mitochondria
 B. Glyoxysomes
 C. Lysosomes
 D. Peroxisomes
- Q.30 Lysosomes are most abundant in:
 A. Plant cells having phagocytic activity
 B. Protozoa
 C. Bacteria with additional DNA plasmids
 D. Animal cells having phagocytic activity
- Q.31 The absence of an enzyme that is involved in the catabolism of lipids results in:
 A. Tay-Sachs disease
 B. Glycogenosis type II
 C. Glycogenosis type I
 D. Phenylketonuria
- Q.32 The lysosomes which eat parts of their cells or cellular components during cellular starvation are called:
 A. Primary lysosomes
 B. Secondary lysosomes
 C. Tertiary lysosomes
 D. Autophagosome
- Q.33 Interior of chloroplast is divided into the heterogeneous structure, embedded in the matrix known as:
 A. Grana
 B. Thylakoids
 C. Stroma
 D. Cisternae
- Q.34 Plastids are only found in the:
 A. Animals and Plants
 B. Plants
 C. Animals
 D. Viruses
- Q.35 The enzymes of lysosomes are synthesized on:
 A. RER
 B. Chloroplast
 C. SER
 D. Golgi apparatus

KIPS Unit-1

- Q.36 The process by which unwanted substances within the cell are engulfed and digested within the lysosome is known as:
 A. Endocytosis
 B. Hydrolysis
 C. Exocytosis
 D. Autophagy
- Q.37 The function of nucleolus is to make:
 A. rDNA
 B. RNA
 C. Ribosomes
 D. Chromosomes
- Q.38 The peptidoglycan cell wall is present in?
 A. *Penicillium*
 B. *Adiantum*
 C. Bacterium
 D. *Polytrichum*
- Q.39 Which of the following function is not performed by the cell membrane of a plant cell?
 A. Regulation of material
 B. Active transport
 C. Transport of material
 D. Phagocytosis
- Q.40 Which organelle in eukaryotic cells functionally resembles mesosomes of prokaryotic cells?
 A. Golgi apparatus
 B. Cell membrane
 C. Endoplasmic reticulum
 D. Mitochondria
- Q.41 Which type of molecule will make channels for the movement of neutral substances down the concentration gradient?
 A. Phospholipids
 B. Nucleic acid
 C. Protein
 D. Carbohydrates
- Q.42 Under which of the following conditions, would you expect to find a cell with a predominance of free ribosomes?
 A. A cell that is secreting proteins
 B. A cell that digests food particles
 C. A cell producing cytoplasmic enzymes
 D. A cell that enlarges its vacuole
- Q.43 Mitochondria have enzymes for all of these processes except:
 A. Replication of DNA
 B. Fatty acid metabolism
 C. Krebs cycle
 D. Fermentation
- Q.44 Which of the following feature is common between prokaryotes and eukaryotes?
 A. A membrane-bounded nucleus
 B. A cell wall made up of cellulose
 C. Presence of ribosomes
 D. Linear genome
- Q.45 Water-soluble pigments found in plant cell vacuoles are
 A. Xanthophylls
 B. Carotenoids
 C. Chlorophylls
 D. Anthocyanin
- Q.46 Different cells have different sizes. Arrange the following cells in ascending order of their size. Choose the correct option among the followings:
 (i) Mycoplasma
 (ii) Ostrich eggs
 (iii) Human RBCs
 (iv) E. coli
 A. (i), (iv), (iii) and (ii)
 B. (ii), (i), (iii) and (iv)
 C. (i), (ii), (iii) and (iv)
 D. (iii), (ii), (i) and (iv)
- Q.47 Which of the following is derived from the cell membrane?
 A. Plasmid
 B. Mesosome
 C. Nucleosome
 D. All A, B, C

KIPS Unit-1

- Q.48 Tonoplast is important for:
 A. Oxidative phosphorylation
 B. Transporting ions against concentration gradients
 C. Providing rigidity to the structure
 D. Cell division
- Q.49 Both cilium and flagellum emerge from centriole like structure which is called:
 A. Basal granules
 B. Basal lamina
 C. Basal bodies
 D. Basal ganglion
- Q.50 Based on the position of the centromere, the chromosomes are classified into how many types?
 A. 1
 B. 2
 C. 3
 D. 4

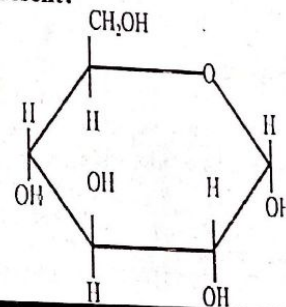
ANSWER KEY

1	C	11	D	21	D	31	A	41	C
2	B	12	A	22	C	32	A	42	C
3	A	13	B	23	B	33	A	43	D
4	A	14	C	24	A	34	B	44	C
5	D	15	B	25	A	35	A	45	D
6	A	16	B	26	D	36	D	46	A
7	D	17	A	27	D	37	C	47	B
8	B	18	A	28	B	38	C	48	B
9	B	19	B	29	A	39	D	49	C
10	A	20	A	30	D	40	D	50	D

2 UNIT BIOLOGICAL MOLECULES & ENZYMES

SELF ASSESSMENT TEST

- Q.1 These are the most abundant organic compounds to be found in cells:
 A. Carbohydrates
 B. Lipids
 C. Proteins
 D. Water
- Q.2 All of the following elements are present in all carbohydrates except:
 A. Carbon
 B. Hydrogen
 C. Oxygen
 D. Nitrogen
- Q.3 Which term most appropriately describes catalase, collagen and haemoglobin?
 A. Enzymes
 B. Globular proteins
 C. Fibrous proteins
 D. Polypeptides
- Q.4 Which property of proteins enables them to act as pH buffers?
 A. They are soluble
 B. They contain carboxyl and amino groups
 C. They have a high molecular mass
 D. They possess both secondary and tertiary structure
- Q.5 The diagram shows a ring structure of glucose. Which form of glucose is shown and in which molecule is it present?



	Form of glucose	Where present
A.	α	Cellulose
B.	α	Starch
C.	β	Cellulose
D.	β	Starch

- Q.6 Silk protein is present in:
 A. Nail
 B. Hair
 C. Plant cell wall
 D. Spider's web
- Q.7 All of the following are true about lipids except:
 A. They store a high amount of energy
 B. They are polymers of fatty acids
 C. They play important role in insulation
 D. They are mostly hydrophobic
- Q.8 The cuticle is an example of:
 A. Acylglycerols
 B. Waxes
 C. Phospholipids
 D. Terpenoids
- Q.9 Which of these is not constituent of waxes?
 A. Long-chain alkanes
 B. Alcohols
 C. Aldehydes
 D. Ketones

KIPS Unit-2

Biological Molecules & Enzymes

- Q.10 All are true about ATP except:
 A. Energy currency of cell
 C. Contains three high energy bonds
- Q.11 Which one of the following is an example of reducing sugar?
 A. Sucrose
 C. Maltose
- Q.12 Adenine and guanine are:
 A. Main nitrogenous bases of nucleic acids
 C. Main nitrogenous bases of phospholipids
- Q.13 Form of polysaccharides stored in bacteria and animals:
 A. Starch
 C. Glycogen
- Q.14 A structural protein is:
 A. Pepsin
 C. Haemoglobin
- Q.15 Sugar found in genetic material is:
 A. Hexose sugar
 C. Pentose sugar
- Q.16 The total number of amino acids in the alpha chain of insulin are:
 A. 20
 C. 30
- Q.17 Which one is found only in RNA?
 A. Cytosine
 C. Adenine
- Q.18 The most common carbohydrate monomer is:
 A. Maltose
 C. Lactose
- Q.19 Which forms nails, hair and feathers?
 A. Fibrin
 C. Keratin
- Q.20 The most important type of RNA in cells is:
 A. rRNA
 C. mRNA
- Q.21 Most cellular secretions are:
 A. Phospholipids
 C. Nucleoproteins
- Q.22 Which of the following statement is not true for compounds like glycoproteins and glycolipids?
 A. Both are conjugated molecules
 B. Both are synthesized in the endoplasmic reticulum
 C. Component of biological membrane
 D. Both are components of the extracellular matrix of animal cell membrane
- Q.23 The number of oxygen atoms in lipid molecules is always _____ as compared to several carbon atoms.
 A. Less
 C. More
- B. Contains ribose sugar
 D. Contains three phosphate groups
- B. Starch
 D. Cellulose
- B. Main nitrogenous wastes of humans
 D. Main types of amino acids in proteins
- B. Cellulose
 D. Chitin
- B. Collagen
 D. Immunoglobulin
- B. Tetrose sugar
 D. Triose sugar
- B. 21
 D. 51
- B. Uracil
 D. Guanine
- B. Glucose
 D. Galactose
- B. Collagen
 D. Elastin
- B. tRNA
 D. cRNA
- B. Glycoproteins
 D. Glycolipids
- B. Equal
 D. Double

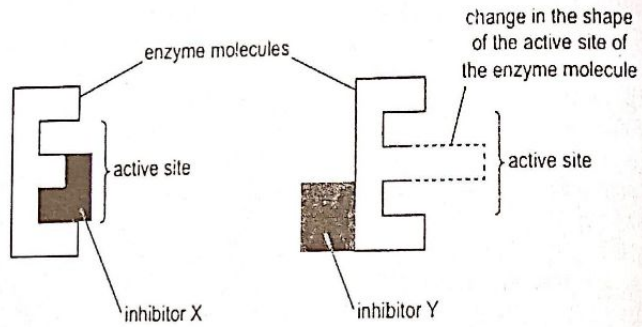
KIPS Unit-2

Biological Molecules & Enzymes

- Q.24 Unsaturated fats are made saturated by:
 A. Polymerization
 C. Hydrogenation
- Q.25 A peptide chain attains secondary structure through the formation of:
 A. Peptide bond
 C. Ionic bond
- Q.26 Which one of the followings is the optimum pH of the pancreatic lipase enzyme?
 A. 7.60
 C. 8.00
- Q.27 The optimum pH of salivary amylase is:
 A. Slightly acidic
 C. Slightly basic
- Q.28 Enzyme after catalysis detaches itself from the product:
 A. Completely
 C. Incompletely
- Q.29 Enzymes increase the rate of reaction by:
 A. Increasing Temperature
 C. Decreasing pH
- Q.30 Enzyme succinate dehydrogenase converts succinate into:
 A. Malate
 C. Malonic acid
- Q.31 The view that active site of an enzyme is flexible and when a substrate combines with it, cause changes in enzyme structure is known as:
 A. Lock & key model
 C. Induced fit model
- Q.32 Regulatory sites other than active site, present over the enzymes are called:
 A. Active sites
 C. Catalytic groups
- Q.33 An activated enzyme consisting of polypeptide chain and a cofactor is called:
 A. Apoenzyme
 C. Coenzyme
- Q.34 Activators are usually derived from:
 A. Vitamins
 C. Proteins
- Q.35 Which step causes activation of catalytic site of an enzyme?
 A. Change in pH of enzyme
 C. Change in the shape of substrate
- Q.36 In a naturally occurring chemical reaction, all active sites are occupied, the rate of reaction would be:
 A. Minimum and constant
 C. Maximum and accelerating
- Q.37 Excessive increase in temperature of medium causes the enzyme molecule to be:
 A. Activated
 C. Denatured
- Q.38 Inhibitors are chemically:
 A. Metals
 C. Inorganic
- B. Dehydrogenation
 D. Hybridization
- B. Hydrogen bond
 D. Disulphide bond
- B. 9.70
 D. 9.00
- B. Highly acidic
 D. Highly basic
- B. Changed
 D. Unchanged
- B. Decreasing Activation Energy
 D. Increasing Activation Energy
- B. Citrate
 D. Fumarate
- B. Sliding filament model
 D. Specificity model
- B. Binding site
 D. Allosteric sites
- B. Holoenzyme
 D. Proenzyme
- B. Carbohydrates
 D. Metal ions
- B. Formation of ES complex
 D. Change in temperature
- B. Zero and constant
 D. Constant and maximum
- B. Unaffected
 D. Inactivated
- B. Organic
 D. All A, B, C

KIPS Unit-2

- Inhibitors which block the enzyme by forming weak bond are called:
 A. Competitive inhibitors.
 B. Non- competitive inhibitors.
 C. Irreversible inhibitors.
 D. Reversible inhibitors.
- Malonic acid is an example of:
 A. Irreversible inhibitor
 B. Reversible inhibitor
 C. Competitive inhibitor
 D. Non-competitive inhibitor
- The specificity of an enzyme is determined by:
 A. Globular shape
 B. pH of the environment
 C. Charge on substrate
 D. Charge and shape of the active site
- High specific heat capacity plays a key role in:
 A. Maintaining the integrity of lipid bilayer membranes
 B. Stabilizing temperature
 C. Producing cooling effect
 D. Bringing about chemical reactions
- It has a more liquid-like consistency than others:
 A. Palmitic acid
 B. Stearic acid
 C. Linoleic acid
 D. Oleic acid
- Catalytic type of RNA is:
 A. tRNA
 B. rRNA
 C. mRNA
 D. Ribozyme
- The diagram represents the reversible interaction between the active site of an enzyme and different inhibitors, X and Y.

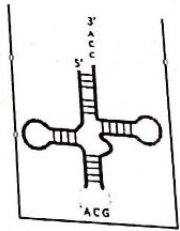


Which row correctly identifies the type of inhibition shown by inhibitor X and inhibitor Y?

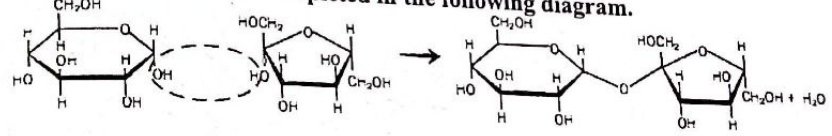
	X	Y
A	competitive	competitive
B	competitive	non-competitive
C	non-competitive	competitive
D	non-competitive	non-competitive

- Vitamin A is an example of:
 A. Monoterpene
 B. Diterpene
 C. Triterpene
 D. Polyterpene

- There are four test tubes with starch compounds. After sometimes substance Y is added in all test tubes. The first 3 test tubes showed blue color but no change in color was shown in test tube 4. What would be the compound that was already present in test tube 4?
 A. Amylase
 B. Iodine
 C. Lipase
 D. Glycogen
- The diagram represents:
 A. mRNA
 B. tRNA
 C. rRNA
 D. Ribozyme



- A few amino acids constitute an active site. Others play role in maintaining:
 A. Fibrous shape
 B. Spindle shape
 C. Cylindrical shape
 D. Ellipsoidal shape
- The formation has been depicted in the following diagram.



- A. Maltose
 B. Lactose
 C. Raffinose
 D. Sucrose

ANSWER KEY

1	C	11	C	21	B	31	C	41	D
2	D	12	A	22	B	32	D	42	B
3	D	13	C	23	A	33	B	43	C
4	B	14	B	24	C	34	D	44	D
5	B	15	C	25	B	35	B	45	B
6	D	16	B	26	D	36	D	46	B
7	B	17	B	27	A	37	C	47	A
8	B	18	B	28	D	38	D	48	B
9	C	19	C	29	B	39	D	49	D
10	C	20	C	30	D	40	C	50	D

3 UNIT

BIOENERGETICS

SELF ASSESSMENT TEST

Q.1 Which of the following describes conditions in a photosynthesizing cell, exposed to high light intensity and low carbon dioxide concentration?

	The concentration of CO ₂ acceptor	Concentration of ATP	The concentration of GP (PGA)
A.	High	High	Low
B.	Low	High	High
C.	High	Low	Low
D.	Low	Low	High

- Q.2 Z-scheme is another name used for:
 A. Cyclic photophosphorylation
 B. Calvin cycle
 C. Non-cyclic photophosphorylation
 D. Oxidative phosphorylation
- Q.3 Which of the following is a molecule formed in a metabolic pathway by the equal splitting of a phosphorylated hexose into two halves?
 A. Acetyl coenzyme A
 B. Ribulose biphosphate
 C. Fructose 1, 6-biphosphate
 D. Triose phosphate
- Q.4 What is the function of molecular oxygen in cellular respiration?
 A. To cause the breakdown of citric acid
 B. To combine with glucose to produce carbon dioxide
 C. To combine with carbon from organic molecules to produce carbon dioxide
 D. To combine with hydrogen from organic molecules to produce water
- Q.5 The reaction which occurs in thylakoid interior space:
 A. Photolysis
 B. ATP synthesis
 C. Transport of electrons
 D. Dark reaction
- Q.6 The wavelengths of light least absorbed by carotenes are:
 A. Blue to green
 B. Red to orange
 C. Yellow to orange
 D. Yellow to red
- Q.7 In which of the following steps, NADH is formed without decarboxylation?
 A. Isocitrate → α-ketoglutarate
 B. Pyruvate → Acetyl CoA
 C. α-ketoglutarate → succinate
 D. Malate → oxaloacetate
- Q.8 The oxidation of which of the following will produce FADH₂?
 A. Malate
 B. Fumarate
 C. FAD
 D. Succinate
- Q.9 Light energy is converted into chemical energy through the formation of:
 A. NADH
 B. ATP and NADPH₂
 C. ADP
 D. RuBP
- Q.10 Stroma is the ground matrix of:
 A. Lysosomes
 B. Ribosomes
 C. Oxysomes
 D. Chloroplast
- Q.11 In which wavelength of light, photosynthesis is maximum?
 A. Red light
 B. Blue light
 C. Green light
 D. Ultra-violet light

- Q.12 The source of protons within the chloroplasts is:
 A. Water
 B. Carbon dioxide
 C. Excited chlorophyll molecules
 D. Rubisco
- Q.13 Dark reactions of carbon assimilation occur in:
 A. Cytoplasmic matrix
 B. Leucoplasts
 C. Mitochondria
 D. Chloroplasts
- Q.14 The number of carbon atoms present in ribulose:
 A. 6
 B. 4
 C. 5
 D. 3
- Q.15 ATP molecules required for the synthesis of a glucose molecule in the Benson-Calvin cycle are:
 A. 36
 B. 12
 C. 38
 D. 18
- Q.16 Photophosphorylation is a synthesis of:
 A. ADP from ATP
 B. ATP from ADP
 C. Glucose 6-phosphate from glucose
 D. NADP⁺ from NAD⁺
- Q.17 Following is/are obtained during cyclic photophosphorylation:
 A. ATP
 B. NADPH₂
 C. O₂
 D. All A, B, C
- Q.18 Before entering the Krebs cycle, the pyruvate is first decarboxylated and oxidized into:
 A. Alpha ketoglutaric acid
 B. Glyceric acid
 C. Citric acid
 D. Acetic acid
- Q.19 ATP formation occurs during all of the following steps of aerobic respiration except:
 A. Glycolysis
 B. Krebs cycle
 C. Pyruvic acid oxidation
 D. Electron transport chain
- Q.20 The action spectrum of photosynthesis was described in 1883 by:
 A. Robert Hill
 B. C. Calvin
 C. T.W. Engelmann
 D. Hatch and Slack
- Q.21 Conversion of NAD⁺ into NADH requires:
 A. 2 Electrons 1 proton
 B. 2 Electrons 2 protons
 C. 1 Electron 2 protons
 D. 1 Electrons 1 proton
- Q.22 Which of the following molecules is reduced by accepting hydrogen in the Calvin cycle?
 A. Glyceraldehyde-3-phosphate
 B. 3-Phosphoglycerate
 C. Ribulose biphosphate
 D. 1,3-Bisphosphoglycerate
- Q.23 Immediate source of energy for cellular metabolism is:
 A. Lipids
 B. Carbohydrates
 C. ATP
 D. Proteins
- Q.24 Krebs cycle in mitochondria takes place in:
 A. Cytosol
 B. Outer Membrane
 C. Matrix
 D. Inner Membrane
- Q.25 Chlorophyll a is present in all except:
 A. Kelps
 B. *Spirogyra*
 C. Wheat
 D. Purple sulphur bacteria

KIPS Unit-3

- Q.26 Energy transformation in biological systems is called:
 A. Metabolism
 B. Photosynthesis
 C. Photorespiration
 D. Bioenergetics
- Q.27 The difference between non-cyclic and cyclic phosphorylation:
 A. Types of photosystems involved
 B. Product form
 C. Time duration
 D. All A, B, and C
- Q.28 The one which is not correct about chlorophyll 'b':
 A. Used in photosynthesis
 B. Soluble in organic solvents
 C. Present in plants
 D. Have different forms
- Q.29 Ribulose biphosphate is a:
 A. Protein
 B. Nucleic acid
 C. Lipid
 D. Carbohydrate
- Q.30 Pick one statement that truly represents the net gain of glycolysis:
 A. $2H_2O$, $2NADH$, $4ATP$, $2Pyruvates$
 B. $2H_2O$, $1NADH$, $4ATP$, $2Pyruvates$
 C. $2H_2O$, $2NADH$, $2ATP$, $2Pyruvates$
 D. $2H_2O$, $4ATP$, $2Pyruvate$
- Q.31 It is a five-carbon compound of the Krebs cycle:
 A. Oxaloacetate
 B. Succinate
 C. Alpha-ketoglutarate
 D. Isocitrate
- Q.32 The first stable compound formed during light-independent reactions contains:
 A. 6 carbon atoms
 B. 3 carbon atoms
 C. 5 carbon atoms
 D. 4 carbon atoms
- Q.33 Enzymes required for respiratory chain are present on/in:
 A. Cristae
 B. Mitochondrial matrix
 C. Inter-membrane space
 D. Cytoplasm
- Q.34 Net gain of ATP molecules produced in algae after the complete breakdown of one glucose molecule during aerobic respiration:
 A. 28
 B. 38
 C. 36
 D. 40
- Q.35 During the Krebs cycle, carbon number is reduced by decarboxylation. It is repeated _____ time/s during one cycle.
 A. One
 B. Two
 C. Four
 D. Three
- Q.36 Calvin cycle is also named as:
 A. C_3 pathway
 B. Sugar synthesis phase
 C. Dark reactions
 D. All of these
- Q.37 It is the most abundant and most important photosynthetic pigment:
 A. Chlorophyll "b"
 B. Chlorophyll "c"
 C. Chlorophyll "d"
 D. Chlorophyll "a"
- Q.38 In which stage of aerobic respiration, 2-carbon molecules are oxidized completely to carbon dioxide?
 A. Glycolysis
 B. Krebs cycle
 C. ETC
 D. Calvin cycle
- Q.39 Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called:
 A. External respiration
 B. Pulmonary respiration
 C. Cellular respiration
 D. Cutaneous respiration

KIPS Unit-3

- Q.40 End products of yeast fermentation, bacterial fermentation, and anaerobic respiration are:
 A. Citric acid, lactic acid, carbon dioxide, and water
 B. Ethyl alcohol, citric acid, and carbon dioxide
 C. Ethyl alcohol, lactic acid, carbon dioxide, and water
 D. Methanol, lactic acid, and citric acid
- Q.41 Oxidative phosphorylation, synthesis of ATP in the presence of oxygen occurs in:
 A. All types of cells
 B. All primitive cells
 C. All anaerobic cells
 D. All aerobic cells
- Q.42 Which part of the chlorophyll molecule absorbs light?
 A. Phytol
 B. Pyrrole
 C. Porphyrin ring
 D. Thylakoid membrane
- Q.43 Identify the correct option concerning the absorption spectrum of photosynthesis:
- | | Peaks | Valley |
|----|----------------|----------------|
| A. | Broad and deep | Narrow |
| B. | Narrow | Broad and deep |
| C. | Broad and deep | Broad and deep |
| D. | Narrow | Narrow |
- Q.44 The electrons excited from photo system-II pass directly to:
 A. Ferredoxin
 B. Plastocyanin
 C. Plastoquinone
 D. Carotenoids
- Q.45 Formation of acetyl CoA from pyruvic acid needs:
 A. A single enzyme
 B. Two enzymes
 C. Multi-enzyme complex
 D. No enzyme
- Q.46 All of the following membranes are involved in chemiosmosis except:
 A. Cristae
 B. Thylakoid
 C. Cristae
 D. Mesosome
- Q.47 How many ATP molecules should be produced from the complete oxidation of a molecule of active acetate or acetyl CoA?
 A. 38ATP
 B. 15ATP
 C. 12ATP
 D. 19ATP
- Q.48 The enzyme, which forms glucose -6- phosphate, is:
 A. Phosphorylase
 B. Phosphatase
 C. Hexokinase
 D. Gluco-synthetase
- Q.49 Maximum number of ATP is obtained from:
 A. Glucose
 B. Palmitic acid
 C. Malic acid
 D. β -amino acid
- Q.50 Which one of the following is Complex-V of the ETS on the inner membrane of mitochondria?
 A. NADH dehydrogenase
 B. Cytochrome oxidase
 C. Ubiquinase
 D. ATP synthetase

ANSWER KEY

1	A	11	A	21	A	31	C	41	D
2	C	12	A	22	D	32	B	42	C
3	D	13	D	23	C	33	A	43	B
4	D	14	C	24	C	34	C	44	C
5	A	15	D	25	D	35	B	45	C
6	A	16	B	26	D	36	A	46	A
7	D	17	A	27	D	37	D	47	C
8	D	18	D	28	D	38	B	48	C
9	B	19	C	29	D	39	C	49	B
10	D	20	C	30	C	40	C	50	D

4 UNIT

LIFE PROCESSES (NUTRITION & GASEOUS EXCHANGE) SELF ASSESSMENT TEST

- Q.1 All insectivorous plants are:
 A. Heterotrophs
 C. Detritivores
 B. Parasitic
 D. Autotrophs
- Q.2 Carnivorous plants use insects and another small organisms as their source of:
 A. Nitrogen
 C. Carbohydrates
 B. Lipids
 D. N, C, Cu, Zn
- Q.3 When an insect touches small sensitive hairs on the surface of the leaf of _____ plant, the lobes quickly come together with their bristles interlocked.
 A. *Sarracenia purpurea*
 C. Pitcher plant
 B. *Drosera intermedia*
 D. *Dionaea muscipula*
- Q.4 Which of the following is not a part of the digestive system of humans?
 A. Liver
 C. Spleen
 B. Salivary glands
 D. Colon
- Q.5 Cardiac sphincter prevents the transfer of food from:
 A. Pharynx to trachea
 C. Stomach to esophagus
 B. Esophagus to stomach
 D. Duodenum to stomach
- Q.6 Stimulation of the parasympathetic nervous system increases:
 A. Peristalsis
 C. Heart rate
 B. Rate of blood flow
 D. Breathing rate
- Q.7 Where protein is completely digested?
 A. Stomach
 C. Ileum
 B. Rectum
 D. Duodenum
- Q.8 Defecation reflex can be consciously inhibited by:
 A. Outer anal sphincter
 C. Inner anal sphincter
 B. Both outer and inner anal sphincters
 D. Cannot be inhibited
- Q.9 Digestion can be defined as the conversion of:
 A. Soluble food into protoplasm
 C. Starch into maltose
 B. Non-diffusible food into diffusible
 D. Small food particles into large particles
- Q.10 It is common for the digestive system and respiratory system:
 A. Nostrils
 C. Nasal cavities
 B. Pharynx
 D. Buccal cavity
- Q.11 The total number of salivary glands present in the oral cavity which secrete only mucus is/are:
 A. 1
 C. 4
 B. 2
 D. 6
- Q.12 Type of digestion that is not helpful indirect absorption of food:
 A. Mechanical
 C. Chemical
 B. Biochemical
 D. Enzymatic
- Q.13 Pyrosis or heart burning is due to the inefficiency of:
 A. Cardiac sphincter
 C. Esophageal sphincter
 B. Pyloric sphincter
 D. Colic sphincter

KIPS Unit-4

Life Process (Nutrition & Gas Exchange)

- Q.14 In normal conditions mastication and peristalsis are under:
 A. Voluntary control
 B. Voluntary and involuntary control
 C. Involuntary control
 D. Involuntary and voluntary control
- Q.15 The liver performs the function of:
 A. Conversion of glucose into glycogen
 B. Deamination
 C. Conversion of glycogen into glucose
 D. All A, B, C
- Q.16 The main function of intestinal villi is to:
 A. Stimulate peristalsis
 B. Provide a large surface area of absorption
 C. Prevent antiperistalsis
 D. Distribute digestive enzymes uniformly
- Q.17 Saliva helps to convert:
 A. Proteins into amino acids
 B. Starch into maltose
 C. Glycogen into glucose
 D. Fats into vitamins
- Q.18 The lacteals are central lymph vessels that are found in:
 A. Liver
 B. Villi
 C. Pancreas
 D. Spleen
- Q.19 Bile aids in the digestion and absorption of fats because it contains:
 A. Lipase
 B. Bile pigments
 C. Salts
 D. Necessary enzymes
- Q.20 An enzyme of the intestinal lining that converts polypeptides into dipeptides:
 A. Trypsin
 B. Maltase
 C. Lipase
 D. Amino peptidase
- Q.21 The innermost layer of the stomach is also named as:
 A. Mucosa
 B. Muscularis
 C. Serosa
 D. Adventitia
- Q.22 The tongue is made up of:
 A. Cartilage and muscles
 B. Skeletal muscles
 C. Muscles and bones
 D. Smooth muscles
- Q.23 Which of the following is not a function of the large intestine?
 A. Absorption of food
 B. Feces formation
 C. Storage
 D. Water absorption
- Q.24 In terrestrial mammals, the movements for ventilation are governed by:
 A. Abdominal muscles
 B. Diaphragm
 C. Skeletal muscles
 D. Diaphragm and intercostal muscles
- Q.25 In human beings, CO₂ concentration in the inspired and expired air is respectively:
 A. 0.01% and 5.3%
 B. 0.04% and 4.0%
 C. 0.4% and 5.0%
 D. 0.04% and 5.0%
- Q.26 Vocal cords are _____ bands stretched across the mucous membrane in the glottis.
 A. Two thick edge cartilaginous
 B. Two thin edges fibrous
 C. Two thin edge muscular
 D. Two pairs of thick edge fibrous
- Q.27 Air is warmed as it passes through:
 A. Nasal cavities
 B. Bronchi
 C. Trachea
 D. Alveoli
- Q.28 Which of the following diverts food mass away from the opening of the larynx?
 A. Esophageal sphincter
 B. Epiglottis
 C. Respiratory Valve
 D. Soft palate

KIPS Unit-4

Life Process (Nutrition & Gas Exchange)

- Q.29 Surfactant is present in:
 A. Alveoli
 B. Bronchioles
 C. Bronchi
 D. All A, B, C
- Q.30 The decrease in pH of blood has _____ effect on the oxygen-carrying capacity
 A. Positive
 B. No effect
 C. Negative
 D. First negative then positive
- Q.31 A structure that does not contain cartilage:
 A. Alveolar duct
 B. Alveolar sacs
 C. Alveoli
 D. All A, B, C
- Q.32 Smooth muscles are present in all except:
 A. Trachea
 B. Bronchi
 C. Bronchioles
 D. Alveoli
- Q.33 The nasal cavity is lined with:
 A. Columnar epithelium
 B. Squamous epithelium
 C. Ciliated epithelium
 D. Cuboidal epithelium
- Q.34 The pigment present in muscles has all characteristics except:
 A. Can bind with four O₂ molecules
 B. Single Haem group
 C. Composed of one polypeptide chain
 D. Iron is present
- Q.35 Pleura is a thin membranous sac that covers the lungs with:
 A. Single-layer
 B. Triple layer
 C. Double-layer
 D. Pair of double layers
- Q.36 Which of the following is not carried by hemoglobin?
 A. Oxygen
 B. Bicarbonate
 C. Carbon dioxide
 D. Carbon monoxide
- Q.37 Percentage of O₂ transported through plasma:
 A. 3%
 B. 97%
 C. 70%
 D. 30%
- Q.38 The process of bringing oxygenated air into contact with a gas exchange surface is:
 A. Ventilation
 B. Gas transport
 C. Photorespiration
 D. Respiration
- Q.39 The mode of respiration in a mammal is:
 A. Mucosal
 B. Cutaneous
 C. Tracheal
 D. Pulmonary
- Q.40 Which is the correct sequence of the air passageway in a man?
 A. Nasal cavity → pharynx → trachea → larynx → bronchi → bronchioles → alveoli
 B. Nasal cavity → pharynx → larynx → trachea → bronchi → bronchioles → alveoli
 C. Nasal cavity → larynx → pharynx → trachea → bronchi → bronchioles → alveoli
 D. Nasal cavity → larynx → bronchi → pharynx → trachea → bronchioles → alveoli
- Q.41 Which of the following statement is correct?
 A. Inspiration is an active process
 B. Expiration is an active process
 C. Inspiration is a passive process
 D. Both expiration and inspiration are passive processes

KIPS Unit-4

Life Process (Nutrition & Gas Exchange)

- Q.42 The maximum amount of air that our lung can normally hold is:
 A. Vital capacity
 B. Total lung capacity
 C. Tidal capacity
 D. Pulmonary capacity
- Q.43 An adult human has 32 permanent teeth, which are of four different types and are called:
 A. Thecodont
 B. Diphyodont
 C. Heterodont
 D. Lophodont
- Q.44 The dental formula of a human being is:
 A. I_2, C_2, P_1, M_3
 B. I_3, C_1, P_2, M_2
 C. I_2, C_1, P_2, M_3
 D. I_2, C_2, P_3, M_1
- Q.45 The bile duct and pancreatic duct open together into the duodenum as a hepato-pancreatic duct which is guarded by a sphincter called:
 A. Sphincter of Boyden
 B. Sphincter of Oddi
 C. Hepato pancreatic ampulla
 D. Cardiac Sphincter
- Q.46 Select from the following the total number of enzymes secreted by the pancreas: *Trypsinogen, Amylase, Lipase, Pepsinogen, Prorennin, Maltase, Sucrase, Chymotrypsinogen, Procarboxypeptidase, Nucleases*
 A. 4
 B. 6
 C. 5
 D. 7
- Q.47 Swelling of the gut is the most common ailment due to:
 A. Bacterial infections
 B. Viral infections
 C. Infection of intestinal parasites (e.g., different types of worms)
 D. All of the above
- Q.48 What is the length of the windpipe?
 A. 12 cm
 B. 15 cm
 C. 18 cm
 D. 20 cm
- Q.49 The inflammation of bronchi or bronchioles is known as:
 A. Emphysema
 B. Pneumonia
 C. Asthma
 D. Bronchitis
- Q.50 In Asthma _____ compound is released by blood cells:
 A. Histamine
 B. Heparin
 C. Epinephrine
 D. Antibodies

KIPS Unit-4

Life Process (Nutrition & Gas Exchange)

ANSWER KEY

1	D	11	B	21	A	31	D	41	A
2	A	12	A	22	B	32	D	42	B
3	D	13	A	23	A	33	C	43	C
4	C	14	B	24	D	34	A	44	C
5	C	15	D	25	B	35	C	45	B
6	A	16	B	26	B	36	B	46	B
7	C	17	B	27	A	37	A	47	D
8	A	18	B	28	B	38	D	48	A
9	B	19	C	29	A	39	D	49	D
10	B	20	D	30	C	40	B	50	A

- Q.1 Root hairs are the extensions of:
A. Pericycle
C. Pith
B. Epidermis
D. Parenchyma
- Q.2 It separates extracellular space in root into two compartments:
A. Cortex
C. Pericycle
B. Plasmodesmata
D. Casparian strips
- Q.3 During the rainy season, wooden doors are difficult to open and close due to:
A. Transpiration
C. Guttation
B. Imbibition
D. Diffusion
- Q.4 Plasmolysis occurs due to:
A. Absorption
C. Exosmosis
B. Endosmosis
D. Osmosis
- Q.5 The hormone which signals the closure of stomata is:
A. Auxins
C. Gibberellins
B. Cytokinins
D. Abscisic acid
- Q.6 According to the mass flow hypothesis, the mass flow of solutes from source to sink is due to:
A. Concentration gradient
C. Osmosis and diffusion
B. Turgor pressure gradient
D. Osmosis
- Q.7 The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of:
A. Cohesion and adhesion
C. Lignified thick wall
B. Transpiration pull
D. Weak gravitational pull
- Q.8 The amount of blood pumped by the heart into the body per minute is called:
A. Atrial output
C. Ventricular output
B. Cardiac output
D. Stroke volume
- Q.9 At the time of diastole, the heart is filled with:
A. Mixed blood
C. Venous blood
B. Oxygenated blood
D. Deoxygenated blood
- Q.10 Blood passes from the right ventricle to the lungs. It is called:
A. Systemic circulation
C. Pulmonary circulation
B. Coronary circulation
D. Atrio-venous circulation
- Q.11 How many valves are present in the human heart?
A. 4
C. 2
B. 3
D. 6
- Q.12 ECG is a diagnostic test for abnormality in:
A. Rhythmicity
C. Valves
B. Pressure
D. Mixing
- Q.13 Which of the following is correctly matched?

		Veins	Capillaries
A.	Blood pressure	Intermediate	Low
B.	Blood flow	Intermediate	Slow
C.	Endothelial cells	No	Yes
D.	Elasticity	Less elastic	No

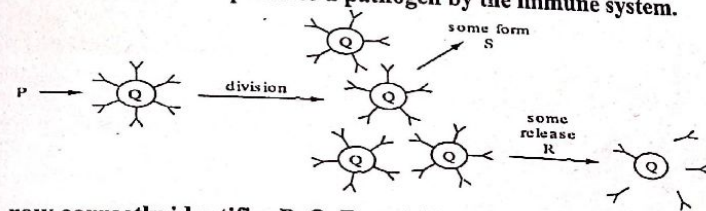
- Q.14 Carotid artery carries:
A. Deoxygenated blood to brain
C. Oxygenated blood to brain
B. Oxygenated blood to the heart
D. Deoxygenated blood to the heart
- Q.15 The tricuspid valve is found in between:
A. Sinus venous and right atrium
C. Right atrium and right ventricle
B. Left ventricle and left atrium
D. Right ventricle and aorta
- Q.16 Contraction of right ventricle pumps blood into:
A. Aorta
C. Pulmonary trunk
B. Pulmonary vein
D. Coronary artery
- Q.17 Cardiac muscles differ from skeletal muscles in their:
A. Control
C. Structure
B. Function
D. All A, B, C
- Q.18 A blood vessel that has maximum cross-sectional area is:
A. Arteries
C. Veins
B. Vena cava
D. Capillaries
- Q.19 The first pair of arteries arise from _____ of heart.
A. Ascending aorta
C. Abdominal aorta
B. Descending aorta
D. Base of the aorta
- Q.20 During each cardiac cycle "Lubb" sound is produced when:
A. AV valves open
C. SL valves close
B. AV valves close
D. Both AV & SL valves close
- Q.21 Which of the following is not a normal component of interstitial fluid?
A. W.B.Cs
C. Dissolve gases
B. Water
D. Platelets
- Q.22 Blood flow through capillaries is less than:
A. 400-450 mm/s
C. 1 mm/s
B. 1 m/s
D. 2 mm/s
- Q.23 The least blood pressure can be observed in:
A. Arteries
C. Veins
B. Capillaries
D. Vena cava
- Q.24 The diameter of a blood capillary can be altered by:
A. Materials passing through it
B. Greater pressure generating by ventricular systole
C. Direct nervous stimulation or by endogenous chemicals
D. Contraction of muscles
- Q.25 The right atrium of the heart usually receives the:
A. Deoxygenated Blood
C. Oxygenated Blood
B. Filtered Blood
D. Non-Filtered Blood
- Q.26 Baroreceptors are located in/at:
A. Wall of aorta
C. Wall of each artery
B. Endothelium of capillary
D. At the base of pulmonary vein
- Q.27 S.A node is located at:
A. Upper end of right atrium
C. Inter-atrial septum
B. Inter-ventricle septum
D. Atrio-ventricle septum
- Q.28 Lymph is a fluid in transient between:
A. Lungs and blood
C. Interstitial fluid and blood
B. Blood and blood
D. Blood cell and interstitial fluid

KIPS Unit-5

- Q.29 All of the followings are components of the lymphatic system except:
 A. Liver B. Spleen
 C. Adenoid D. Tonsils
- Q.30 A first artery that arises from the base of the aorta:
 A. Pulmonary artery B. Renal artery
 C. Coronary artery D. Iliac artery
- Q.31 The ultimate destination of lymph is:
 A. Lymph Node B. Lymphoid Organs
 C. Lymph Capillaries D. Subclavian vein
- Q.32 The flow of lymph in lymphatic vessels is maintained by:
 A. Heart, the activity of smooth muscles and valves
 B. Activity of skeletal muscles, heart, and breathing movements
 C. Breathing movements, the activity of skeletal muscles and valves
 D. Exercise, breathing movements, and heart
- Q.33 The thymus gland is involved in the maturation of:
 A. Platelets B. Eosinophils
 C. B-Lymphocytes D. T-Lymphocytes
- Q.34 In passive immunity which of the following components are injected into blood:
 A. Antigens B. Serum
 C. Immunogens D. Immunoglobulins
- Q.35 The antigen is a foreign protein or any other molecule which stimulates the formation of:
 A. MC complex B. Mucus
 C. Immunogen D. Antibodies
- Q.36 Skin and mucous membranes are part of the body defense system and they form the:
 A. Physical barrier B. Chemical barriers
 C. Mechanical barriers D. Biological barriers
- Q.37 Which part of the antibody recognizes the antigen during the immune response?
 A. Heavy part B. Light part
 C. Variable part D. Consonant part
- Q.38 The study of mechanisms of body defense is called:
 A. Immunology B. Teratology
 C. Serology D. Microbiology
- Q.39 The immune system is an example of:
 A. 1st line of defense B. 3rd line of defense
 C. 2nd line of defense D. 4th line of defense
- Q.40 The color of plasma is:
 A. Straw color B. Colorless
 C. Red color D. Blue color
- Q.41 Which of the following is associated with allergic reactions?
 A. Neutrophils B. Eosinophils
 C. Monocytes D. Lymphocyte
- Q.42 Which of the following statements is not true?
 A. Heart is ectodermal in origin
 B. The heart is situated in the thoracic cavity
 C. Human heart has the size of a clenched fist
 D. Heart is protected by the pericardium

KIPS Unit-5

- Q.43 Which of the following artery supplies blood to myocardial muscles?
 A. Coronary B. Renal
 C. Iliac D. Gastric
- Q.44 During the cardiac cycle, each ventricle pumps out about 70 ml of blood which is called:
 A. Stroke volume B. Heart Rate
 C. Cardiac output D. Residual volume
- Q.45 Which of the following correctly explains a phase/event in the cardiac cycle in a standard electrocardiogram?
 A. The QRS complex indicates atrial contraction
 B. The QRS complex indicates ventricles contraction
 C. The time between S and T represents atrial systole
 D. The P-wave indicates the beginning of ventricular contraction
- Q.46 Phloem sap is mainly composed of:
 A. Water + Glucose B. Water + Cellulose
 C. Water + Fructose D. Water + Sucrose
- Q.47 An antiserum against snake toxin can be obtained by injecting the toxin into a horse. The antiserum is made from plasma taken from the horse a few weeks later. The antiserum is used to treat a person who has been bitten by the same species of snake. What does the person's treatment bring about?
 A. Artificial active immunity B. Natural active immunity
 C. Artificial passive immunity D. Natural passive immunity
- Q.48 The diagram shows the response to a pathogen by the immune system.



Which row correctly identifies P, Q, R, and S?

	P	Q	R	S
A.	Antibody	T-lymphocyte	Antigen	Plasma Cell
B.	Antigen	B-lymphocyte	Antibody	Memory Cell
C.	Antigen	T-lymphocyte	Antitoxin	B-lymphocyte
D.	Bacteria	B-lymphocyte	Antibody	T-lymphocyte

- Q.49 Which of these is a lymphoid organ that is active in young children, but decreases in size and is important in adulthood?
 A. Adenoids B. Spleen
 C. Thymus D. Tonsils
- Q.50 Which enzyme causes the conversion of prothrombin into thrombin?
 A. Carbonic anhydrase B. Thrombokinase
 C. Cytochrome oxidase D. Rennin

ANSWER KEY >>>

1	B	11	A	21	D	31	D	41	B
2	D	12	A	22	C	32	C	42	A
3	B	13	D	23	D	33	D	43	A
4	C	14	C	24	C	34	D	44	A
5	D	15	C	25	A	35	D	45	B
6	B	16	C	26	A	36	A	46	D
7	A	17	D	27	A	37	C	47	C
8	B	18	D	28	C	38	A	48	B
9	C	19	D	29	A	39	B	49	C
10	C	20	B	30	C	40	A	50	B

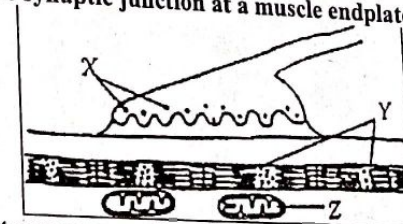
6 UNIT

COORDINATION & CONTROL NERVOUS & CHEMICAL COORDINATION SELF ASSESSMENT TEST

- Q.1 Dwarfism is a hormonal disorder due to:
 A. Deficiency of thyroxin
 C. Excess of thyroxin
 B. Deficiency of STH
 D. Deficiency of insulin
- Q.2 The function of ACTH is to:
 A. Stimulate pituitary gland
 C. Stimulate adrenal cortex
 B. Stimulate adrenal medulla
 D. Stimulate thyroid gland
- Q.3 Corpus luteum produces:
 A. Progesterone
 C. Cortisol
 B. Estrogen
 D. Testosterone
- Q.4 Hormones can regulate other hormones through:
 A. Competition
 C. Inhibition
 B. Feedback mechanism
 D. Antagonizing
- Q.5 A patient who excretes a large quantity of sodium in urine has:
 A. Diseased adrenal medulla
 C. Diseased adrenal cortex
 B. Diseased pancreas
 D. Diseased thymus
- Q.6 A chorionic gonadotropic hormone is secreted by:
 A. Ovary
 C. Pituitary
 B. Uterus
 D. Placenta
- Q.7 Besides testes, androgens are also produced by:
 A. Thyroid
 C. Thymus
 B. Adrenal medulla
 D. Adrenal cortex
- Q.8 Which is not a ductless gland?
 A. Testis
 C. Ovary
 B. Sub-maxillary
 D. Parathyroid
- Q.9 Secretion of estrogen is under the control of:
 A. FSH
 C. Progesterone
 B. LH
 D. STH
- Q.10 It is secreted as a result of distension of the cervix:
 A. ADH
 C. Thyroxin
 B. Oxytocin
 D. MSH
- Q.11 Diabetes insipidus is due to less secretion of:
 A. Vasopressin
 C. Insulin
 B. Thyroxine
 D. Progesterone
- Q.12 The chemical nature of LH and ICSH is:
 A. Steroids
 C. Polypeptides
 B. Tyrosine derivatives
 D. Amino acids
- Q.13 Addison's disease can be due to all reasons except:
 A. Hypothalamus
 C. Adrenal cortex
 B. Pituitary gland
 D. Adrenal medulla
- Q.14 Which one causes the release of pancreatic exocrine secretion?
 A. Glucose
 C. Gastrin
 B. Secretin
 D. Bile
- Q.15 Vasodilation in muscles is done by the action of:
 A. Norepinephrine
 C. Epinephrine
 B. Cortisol
 D. Glucagon

- Q.16 Which part of a neuron may act as a receptor as well?
 A. Dendrite B. Cell body
 C. Axon D. Ganglion
- Q.17 It acts as a relay neuron:
 A. Sensory B. Associative
 C. Motor D. Uni-polar
- Q.18 White matter in the central nervous system is composed of:
 A. Nerve cells B. Non-myelinated nerve fibers
 C. Myelinated nerve fibers D. Connective
- Q.19 The function of nervous tissue is:
 A. Irritability B. Responsiveness
 C. Sensitivity D. All A, B, C
- Q.20 Thermoregulatory center in the body is found in:
 A. Skin B. Hypothalamus
 C. Adrenal Gland D. Pituitary
- Q.21 Motor neurons carry messages from associative neurons to:
 A. Skeletal muscles B. Cardiac muscles
 C. Smooth muscles D. All A, B, C
- Q.22 The type of receptors present in the hypothalamus are:
 A. Mechanoreceptors B. Chemoreceptors
 C. Photoreceptors D. Pressure receptors
- Q.23 The groups of ribosomes associated with RER in a neuron:
 A. Meissner's corpuscles B. Nissl's granules
 C. Pacinian corpuscles D. Dorsal root ganglion
- Q.24 Part of motor neuron which makes a synapse with sarcolemma is:
 A. Motor unit B. Axon
 C. Dendron D. Dendron and axon
- Q.25 How many sensations are detected by the skin?
 A. 5 B. 4
 C. 3 D. 2
- Q.26 Which of the following membrane potential depicts hyperpolarization?
 A. -50mV B. -90mV
 C. +50mV D. -70mV
- Q.27 The spiny look of neurons is due to their:
 A. Myelin sheath B. Axon
 C. Dendron D. Dendrites
- Q.28 These are the structures that respond when they are stimulated by an impulse coming through motor neuron:
 A. Glands B. Thermo-receptors
 C. Sensory neurons D. Pacinian corpuscles
- Q.29 CNS was first developed in:
 A. Cnidarians B. Platyhelminthes
 C. Chordates D. Mammals
- Q.30 Which of the following is not the part of the forebrain?
 A. Reticular formation B. Amygdala
 C. Hippocampus D. Thalamus

- Q.31 Our most unconscious behaviors are controlled by:
 A. Thalamus B. Limbic system
 C. Cranial nerves D. Cerebral cortex
- Q.32 One that connects both cerebral hemispheres is called:
 A. Corpus luteum B. Corpus striatum
 C. Corpus callosum D. Tracts
- Q.33 Stimulation of the vagus nerve will cause:
 A. Increase blood pressure B. Decreased heart rate
 C. Increased blood flow to limbs D. Dilation of the pupil of the eye
- Q.34 During Addison's disease:
 A. MSH and cortical hormones increases B. MSH increases, cortical hormones decreases
 C. MSH and cortical hormones decreases D. MSH decreases, cortical hormones increases
- Q.35 The pineal gland is located in/at:
 A. Spinal canal B. Brain
 C. Neck D. Stomach mucosa
- Q.36 An effect of progesterone on the ovary is to:
 A. Thicken and vascularize it B. Prevent ripening of follicles
 C. Ovulation D. Placenta formation
- Q.37 A male body tends more towards the form of immature female after:
 A. Spermiogenesis B. Castration
 C. Deficiency of dopamine D. Hypergonadism
- Q.38 Rickets will be caused due to which hormonal abnormality:
 A. No exposure to sunlight B. PTH excess
 C. Vitamin D excess D. LTH absence
- Q.39 All are amino acid derivatives except:
 A. Thyroxin B. Aldosterone
 C. Epinephrine D. Nor-adrenalin
- Q.40 These contain cell bodies of neurons:
 A. Gray and white matter B. Ganglia and gray matter
 C. Nerve and ganglia D. Nerve and white matter
- Q.41 The outermost of the three cranial meninges is:
 A. Arachnoid mater B. Pia mater
 C. Dura mater D. Sclera
- Q.42 The dorsal nerve root ganglion is:
 A. Bipolar B. Pseudounipolar
 C. Unipolar D. Multipolar
- Q.43 The diagram shows the synaptic junction at a muscle endplate.



Which chemical substances were released from the X, Y, and Z regions?

	X	Y	Z
A.	Acetylcholine	Calcium ions	ATP
B.	Acetylcholine	Sodium ions	Pyruvate
C.	Adrenaline	Potassium ions	Pyruvate
D.	Calcium ions	Sodium ions	Pyruvate

KIPS Unit-6

- Q.44 Hypothalamus does not control:
A. Hunger and satiety
C. Thermoregulation
- Q.45 Hypothalamus contains several groups of neurosecretory cells called _____ which produce hormones.
A. Ganglion
C. Plexus
- Q.46 Diuresis is reduced by:
A. Oxytocin
C. Prolactin
- Q.47 Aldosterone helps in the maintenance of all except:
A. Electrolyte and body fluid volume
C. Osmotic pressure
- Q.48 Diabetes mellitus is characterized by all except:
A. Ketonuria
C. Glycosuria
- Q.49 Insufficient thyroxine in adults leads to:
A. Dwarfism
C. Cretinism
- Q.50 The diurnal rhythm of our body such as the sleep-wake cycle is regulated by the hormone:
A. Calcitonin
C. Prolactin
- B. Osmo-regulation
D. Creative thinking and consciousness
- B. Nuclei
D. Astrocytes
- B. Luteinizing hormone
D. Vasopressin
- B. Blood pressure
D. Smooth muscles contraction
- B. Prolonged hyperglycemia
D. No effect on vision
- B. Myxedema
D. Grave's disease
- B. Adrenaline
D. Melatonin

ANSWER KEY

1	B	11	A	21	D	31	B	41	C
2	C	12	B	22	B	32	C	42	B
3	A	13	A	23	B	33	B	43	A
4	B	14	C	24	B	34	B	44	D
5	C	15	D	25	C	35	B	45	B
6	D	16	B	26	B	36	B	46	D
7	D	17	C	27	D	37	B	47	D
8	B	18	A	28	A	38	B	48	D
9	A	19	B	29	B	39	B	49	B
10	B	20	C	30	A	40	B	50	D

7
UNIT

REPRODUCTION
SUPPORT AND MOVEMENT
SELF ASSESSMENT TEST

- Q.1 Each myosin molecule has one tail and:
A. 3 globular heads
C. 1 globular head
- Q.2 The protein filament which binds to the calcium:
A. Actin
C. Troponin
- Q.3 The majority of muscles of our body are:
A. Smooth
C. Skeletal
- Q.4 Each muscle fiber is surrounded by a membrane which is called:
A. Sarcomere
C. Sarcolemma
- Q.5 During muscle contraction:
A. I-band shortens
C. Myosin filaments shorten
- Q.6 The sliding protein of muscle is:
A. Tubulin
C. Myosin
- Q.7 The pigment which stores oxygen in muscles is:
A. Hemoglobin
C. Myoglobin
- Q.8 The length of myofibril from one Z-band to the next Z-band is known as:
A. Sarcomere
C. Sarcolemma
- Q.9 Calcium ions released during a muscle fiber contraction attach with:
A. Myosin
C. Actin
- Q.10 Regarding skeletal muscle structure, the area which contains only thick filaments:
A. A-band
C. H-zone
- Q.11 For muscle contraction, calcium ions in sarcoplasm are released from:
A. T-tubule
C. Sarcoplasmic reticulum
- Q.12 Which of the following is a structural unit of skeletal muscles?
A. Myofilament
C. Myofibril
- Q.13 A sarcomere is an area between:
A. Two I-bands
C. A and I-bands
- Q.14 The smallest contractile part of a skeletal muscle is:
A. Myofilament
C. Microfilament
- B. 2 globular heads
D. No globular head
- B. Myosin
D. Tropomyosin
- B. Cardiac
D. None of these
- B. Twitch fiber
D. Capsule
- B. Actin filaments shorten
D. Z-line disappears
- B. Myoglobin
D. Actin
- B. Myosin
D. Actinomyosin
- B. Sarcoplasm
D. Muscle Fiber
- B. Tropomyosin
D. Troponin
- B. I-band
D. Z-line
- B. Mitochondria
D. Myosin filament
- B. Muscle fiber
D. Sarcomere
- B. Two Z-lines
D. Z and H-bands
- B. Myofibre
D. Sarcomere

- Q.15 Which band does not change its length during muscle contraction?
 A. I-band
 B. Two Z-lines
 C. A-band
 D. A and I-bands
- Q.16 T-tubules in skeletal muscles are formed by:
 A. SER
 B. Sarcolemma
 C. RER and SER
 D. Cytoplasm
- Q.17 Bones protect critical internal organs like:
 A. Brain, spinal cord, heart
 B. Brain, all nerves, spinal cord
 C. Heart, stomach, eyes
 D. Spinal cord, pinna of ears, lungs
- Q.18 A statement not true about bones and cartilages:
 A. Both contain living cells
 B. Both contain the same type of living cells
 C. Both have a ground matrix of collagen
 D. Both are part of the endoskeleton
- Q.19 The total number of "Free Ribs" in the human body is:
 A. 1
 B. 4
 C. 2
 D. 8
- Q.20 Knee and elbow joints are examples of:
 A. Ball and socket joint
 B. Cartilaginous joints
 C. Hinge joint
 D. Fibrous joint
- Q.21 Which of the followings are characteristics of Visceral muscles except?
 A. Contain muscle proteins
 B. Have multiple nuclei
 C. Have striations
 D. Help in peristalsis
- Q.22 Sertoli cells are under the control of:
 A. LH
 B. FSH
 C. ICSH
 D. Testosterone
- Q.23 It is the correct passage of sperms from testes to outside:
 A. Seminiferous tubules → Sperm duct → Epididymis → Urethra
 B. Sperm duct → Seminiferous tubule → Epididymis → Urethra
 C. Epididymis → Seminiferous tubule → Sperm duct → Urethra
 D. Seminiferous tubules → Epididymis → Sperm duct → Urethra
- Q.24 Glands of the male reproductive system are:
 A. Prostate and seminal vesicle
 B. Seminal vesicles and Corpus luteum
 C. Prostate and Corpus luteum
 D. Prostate and Placenta
- Q.25 The highly convoluted duct is:
 A. Vas deference
 B. Sperm duct
 C. Epididymis
 D. Urinogenital duct
- Q.26 Newborn does not acquire eye infection in:
 A. Syphilis
 B. Genital herpes
 C. AIDS
 D. Gonorrhoea
- Q.27 The bacteria that infect the mucous membranes of the urinogenital tract is:
 A. *Clostridium tetani*
 B. *Treponema pallidum*
 C. *Neisseria gonorrhoea*
 D. *Staphylococcus aureus*
- Q.28 Ulcers in reproductive tracts are formed in:
 A. Gonorrhoea
 B. Syphilis
 C. AIDS
 D. Genital herpes
- Q.29 In a menstrual cycle of 24 days, which of the following will be the day of ovulation?
 A. 14th day
 B. 7th day
 C. 10th day
 D. 6th day

- Q.30 The end or complete stop of the menstrual cycle is called:
 A. Andropause
 B. Menopause
 C. Menstruation
 D. Menarche
- Q.31 Follicular atresia is the degeneration of:
 A. Primary oocyte
 B. 1st polar body
 C. Primary follicles
 D. 2nd polar body
- Q.32 FSH in males acts on:
 A. Germinal epithelium
 B. Simple epithelium
 C. Interstitial cells
 D. Germinal endothelium
- Q.33 Progesterone level is increased in all conditions except:
 A. Gestation
 B. Luteal phase
 C. Pregnancy
 D. Menstruation
- Q.34 The structure that is formed at the site of ovulation:
 A. Placenta
 B. Graffian follicle
 C. Corpus luteum
 D. Primary Oocyte
- Q.35 The oocyte released during ovulation is in:
 A. Anaphase I
 B. Metaphase I
 C. Prophase I
 D. Metaphase II
- Q.36 Fertilization in humans occurs in:
 A. Uterus
 B. Fallopian tube
 C. Vagina
 D. Urethra
- Q.37 A primary oocyte is:
 A. Diploid
 B. Polyploid
 C. Haploid
 D. Monoploid
- Q.38 Implantation of zygote occurs at:
 A. Oviduct
 B. Uterine tube
 C. Uterus
 D. Cervix
- Q.39 Oogenesis in human females starts:
 A. At puberty
 B. Before birth
 C. Before puberty
 D. After puberty
- Q.40 Pre-fertilization events among the following are:
 A. Syngamy
 B. Formation of zygote
 C. Gametogenesis and gamete transfer
 D. Embryogenesis
- Q.41 The scrotum is responsible for which of the following in the male reproductive system?
 A. Formation of sperm
 B. Lubrication
 C. Nourishment of sperm
 D. Temperature regulation
- Q.42 Once a sperm fuses with an ovum, the remaining sperm cannot fertilize the ovum. What changes are responsible for such a phenomenon?
 A. Selective permeation through ovum
 B. Specific spatial arrangement of corona radiata cells
 C. Change in the membrane zona pellucida
 D. Ovum releases toxic substances thereby killing other sperms
- Q.43 Muscle is derived from:
 A. Mesoderm
 B. Endoderm
 C. Ectoderm
 D. All of these

Q.44 The dark bands (A-bands) of a skeletal muscle are known as:

- A. Isotropic bands
- B. Intercalated disc
- C. Anisotropic bands
- D. Cross bridges

Q.45 The motor unit is best described as:

- A. All the nerve fibers and muscle fibers in a single muscle bundle
- B. One muscle fiber and its single nerve fiber
- C. A single motor neuron and all the muscle fibers that it innervates
- D. As the neuron which carries the message from muscles to CNS

Q.46 Match the following:

Bone	Number
1. Skull	1. 24
2. Vertebrae	2. 60
3. Ribs	3. 22
4. Sternum	4. 1
5. Pectoral girdles	5. 2
6. Arms	6. 4
7. Ear ossicles	7. 6
8. Pelvic girdles	8. 33

The correct pairing sequence is

- A. 8-3, 1-6, 6-2, 5-7
- B. 3-8, 1-8, 2-6, 7-5
- C. 3-8, 1-2, 6-2, 7-5
- D. None of these

Q.47 Which of the following pairs is correctly matched?

- A. Hinge joint
Between vertebrae
- B. Cartilaginous joint
Between carpal and metacarpal of the thumb
- C. Gliding joint
Between carpels
- D. Fibrous joint
Flat skull bones

Q.48 ATPase activity is associated with:

- A. Actin
- B. Myosin
- C. Troponin
- D. Actin

Q.49 It allows rotatory movement:

- A. Pivot joint
- B. Synovial joint
- C. Hinge joint
- D. Fibrous joint

Q.50 Which hormone regulates spermatogenesis:

- A. T4
- B. Estrogen
- C. Inhibin
- D. Progesterone

ANSWER KEY

1	B	11	C	21	B	31	C	41	D
2	C	12	B	22	B	32	A	42	C
3	C	13	B	23	D	33	D	43	A
4	C	14	D	24	A	34	C	44	C
5	A	15	C	25	C	35	D	45	C
6	D	16	B	26	C	36	B	46	D
7	C	17	A	27	B	37	A	47	D
8	A	18	B	28	D	38	C	48	B
9	D	19	B	29	C	39	B	49	A
10	C	20	C	30	B	40	C	50	B

- Q.1 In which step of the life cycle of bacteriophage, tail releases enzyme lysozyme?
A. Attachment
B. Adsorption
C. Penetration
D. Injection
- Q.2 Bacteriophage is an example of:
A. Obligate intracellular parasite
B. Obligate ectoparasite
C. Facultative intracellular parasite
D. Facultative endoparasite
- Q.3 It is an RNA non-enveloped virus:
A. Poliovirus
B. Poxvirus
C. Influenza virus
D. Herpes virus
- Q.4 The unifying character of all bacteria:
A. Peptidoglycan
B. Conjugation
C. Haploid
D. Capsule
- Q.5 When cocci form a long chain of cells then the arrangement is called:
A. Diplococci
B. Sarcina
C. Streptococci
D. Staphylococci
- Q.6 Which of the following is commonly present in all bacteria?
A. Nucleoid
B. Pili
C. Plasmid
D. Cell wall
- Q.7 The type of glycocalyx that is loosely attached to the bacterial cell is called:
A. Cell wall
B. Capsule
C. Slime
D. Cell membrane
- Q.8 The particles which don't have nucleic acid as their hereditary material:
A. Virions
B. Prions
C. Viroids
D. Non-enveloped viruses
- Q.9 Pathogenicity of bacteriophage is due to its:
A. Envelope
B. Tail
C. Nucleic acid
D. Capsid
- Q.10 Antibiotics are mostly obtained from:
A. Bacteria
B. Angiosperms
C. Viruses
D. Fungi
- Q.11 The uniqueness of bacterial photosynthesis is because it can occur:
A. Without CO₂
B. Without chlorophyll a
C. Without pigment
D. Without light
- Q.12 Gram-positive bacteria differ from Gram-negative bacteria in the structure of their:
A. Nucleoid
B. Cell wall
C. Cytoplasm
D. Ribosomes
- Q.13 Bacteria that need oxygen but can also live in the absence of oxygen are:
A. Obligate aerobes
B. Obligate anaerobes
C. Microaerophilic
D. Facultative anaerobes
- Q.14 A nitrogen-fixing organism that can be symbiotic is:
A. Dinoflagellates
B. Liverworts
C. *Rhizobium*
D. Moss

- Q.15 Bacterial ribosomes lie in/on:
A. Cytoplasm
B. Nuclear membrane
C. RER
D. Cell wall
- Q.16 Mouth, lips, and skin are affected due to the infection of:
A. Pox virus
B. Herpes virus
C. Paramyxovirus
D. Adenovirus
- Q.17 Tumor causing virus is:
A. DNA enveloped
B. DNA non-enveloped
C. RNA enveloped
D. RNA non-enveloped
- Q.18 Which of the following are the smallest bacteria?
A. *E. coli*
B. *Mycoplasma*
C. Spirochete
D. *Streptococci*
- Q.19 Plasma membrane and everything in it is called:
A. Leucoplast
B. Phragmoplast
C. Protoplast
D. Cytoplasm
- Q.20 Hepatitis A and E are transmitted by contact with _____ from infected individuals.
A. Serum
B. Blood
C. Faeces
D. Saliva
- Q.21 Viruses can infect and parasitize _____.
A. Mammals
B. Humans
C. Bacteria
D. All of these
- Q.22 Which one is not a living character of the virus?
A. Mutation
B. Genome
C. Replication
D. Crystallization
- Q.23 Stanley crystallized.
A. HIV
B. TMV
C. HBV
D. T2
- Q.24 Phage attaches to bacterial cell surface by its:
A. Sheath
B. Core
C. Head
D. Tail
- Q.25 Which process/es take/s place during the lytic cycle?
A. Replication
B. Transcription
C. Translation
D. All of these
- Q.26 Pick the false statement about AIDS:
A. HIV infection
B. Reverse transcription in HIV particle
C. Destruction of T cells
D. Cure after proper medication
- Q.27 Virus attacks and hijacks host's _____.
A. Mitochondria
B. Nucleus
C. Ribosomes
D. Endoplasmic reticulum
- Q.28 It is anti-viral:
A. Penicillin
B. Streptomycin
C. Tetracycline
D. Interferon
- Q.29 _____ is the second major form of hepatitis:
A. Hepatitis A
B. Hepatitis B
C. Hepatitis C
D. Hepatitis D

KIPS Unit-8

- Q.30 Bacteria and cyanobacteria very closely resemble in their:
A. Mode of nutrition
B. Mode of respiration
C. Pigment composition
D. Cell wall composition
- Q.31 Which structure is involved in the transfer of genetic material from one bacterium to another?
A. Flagella
B. Pili
C. Cytoplasm
D. Mesosomes
- Q.32 *Salmonella typhi* exhibits which shape?
A. Spherical
B. Spiral
C. Rod-shape
D. Comma-shape
- Q.33 All of the following bacteria have definite shapes except:
A. *Clostridium tetani*
B. *Spirillum*
C. *Salmonella typhi*
D. *Mycoplasma*
- Q.34 The major cell infected by the HIV is:
A. Leucocyte
B. Helper T-lymphocyte
C. Monocyte
D. B-lymphocyte
- Q.35 Chemically, viruses are made up of:
A. Nucleic acid only
B. Nucleic acid and protein
C. Protein only
D. Core and coat
- Q.36 Reverse transcriptase is used to make DNA copies of:
A. Host RNA
B. Host DNA
C. Viral RNA
D. Viral DNA
- Q.37 Which of the following contains peptidoglycan cell walls?
A. *Penicillium*
B. *Adiantum*
C. Bacterium
D. *Polytrichum*
- Q.38 Antibiotics that kill microbes immediately are called _____.
A. Microbistatic
B. Biostatic
C. Microbicidal
D. Chemotherapeutic
- Q.39 Mesosomes are infoldings of the cell membrane and are involved in:
A. DNA replication
B. Protein synthesis
C. RNA synthesis
D. Metabolism
- Q.40 Which statement about bacteria is true:
A. Gram-positive bacteria have more lipids in their cell wall
B. Gram-negative bacteria have more lipids in their cell wall
C. Lipids are absent in the cell wall of both gram-positive and negative bacteria
D. Both have an equal amount of lipids
- Q.41 RNA viruses appear to have higher rates of mutation because:
A. RNA nucleotides are more unstable than DNA nucleotides
B. Replication of their nucleic acid does not involve the proofreading steps of DNA replication
C. RNA viruses replicate faster
D. RNA viruses respond more to mutagens
- Q.42 Reverse transcriptase is:
A. RNA dependent RNA polymerase
B. DNA dependent RNA polymerase
C. DNA dependent DNA polymerase
D. RNA dependent DNA polymerase
- Q.43 A characteristic of viruses is:
A. Without independent metabolism
B. Multiplication outside living cells
C. With independent metabolism
D. Can be a culture in cell-free medium

- Q.44 Which one of the following statements about viruses is correct?
A. Viruses possess their own metabolic system
B. Viruses are obligate parasites
C. All viruses contain both RNA and DNA
D. Nucleic acid of viruses is known as capsid
- Q.45 Bacteria that convert nitrates into free nitrogen are:
A. Ammonifying
B. Denitrifying
C. Nitrifying
D. Nitrogen-fixing bacteria
- Q.46 Bacteria lack alternation of generations because there is:
A. Neither syngamy nor reduction division
B. No conjugation
C. Distinct chromosomes are absent
D. No exchange of genetic material
- Q.47 All are the characteristics of Gram-positive bacteria except:
A. High content of peptidoglycan
B. High permeability
C. Teichoic acid is present
D. Stain pink with primary dye
- Q.48 Bacteria differ from viruses in:
A. Pathogenic nature
B. Having well-defined cytoplasm
C. Genetic material
D. Lacking proper nucleus
- Q.49 A bacterium divides every 36 minutes. If a culture containing 10^5 cells/ml is grown for 180 minutes, what will be cell concentration after that period?
A. 175×10^5
B. 5×10^5
C. 35×10^5
D. 32×10^5
- Q.50 Which vitamin is synthesized by bacteria in the human gut?
A. A
B. D
C. C
D. K

ANSWER KEY

1	C	11	B	21	D	31	B	41	B
2	A	12	B	22	D	32	C	42	D
3	A	13	D	23	B	33	D	43	A
4	C	14	C	24	D	34	B	44	B
5	A	15	A	25	D	35	B	45	B
6	A	16	B	26	D	36	C	46	A
7	C	17	C	27	C	37	C	47	D
8	B	18	B	28	D	38	C	48	B
9	C	19	C	29	B	39	A	49	D
10	A	20	C	30	D	40	B	50	D

9 UNIT

DIVERSITY AMONG ANIMALS

SELF ASSESSMENT TEST

- Q.1 Direct ancestors of grade radiata are:
 A. Parazoa
 C. Protozoa
 B. Porifera
 D. Eumetazoa
- Q.2 All are characteristics of mollusks except:
 A. Soft-bodied
 C. Bilateral symmetry
 B. Triploblast
 D. Pseudocoelomates
- Q.3 The body cavity is truly divided in all of the following except:
 A. Molluscs
 C. Annelids
 B. Arthropods
 D. Roundworms
- Q.4 Highly organized mesoderm represents:
 A. Complex organ formation
 C. Simple organ formation
 B. Radial symmetry
 D. Bilateral symmetry
- Q.5 Which of the following is the outer layer of the mesoderm?
 A. Parietal
 C. Intestinal
 B. Viseral
 D. Muscular
- Q.6 In animals, a reproductive system developed from:
 A. Ectoderm
 C. Mesoderm
 B. Blastoderm
 D. Endoderm
- Q.7 Which one of the following is correct about parazoa?
 A. Radial symmetry
 C. Indeterminate shape
 B. Triploblastic organization
 D. Indeterminate cleavage
- Q.8 During embryonic development, the mouth is formed at some distance anterior to the blastopore, and the blastopore forms the anus in:
 A. Echinoderms
 C. Nematoda
 B. Mollusca
 D. Aschelminthes
- Q.9 Saclike digestive system is present in:
 A. Cnidarian
 C. Arthropoda
 B. Platyhelminthes
 D. Chordates
- Q.10 Which one of the following is an example of a radial organism?
 A. Planaria
 C. Sea anemone
 B. Human
 D. Insects
- Q.11 Sharks and rays are included in class:
 A. Cyclostomata
 C. Chondrichthyes
 B. Osteichthyes
 D. Tetrapoda
- Q.12 Which of the following does not have specialized respiratory organs?
 A. Hydra
 C. Birds
 B. Cockroach
 D. Both A and B
- Q.13 The coelom is a cavity lined by:
 A. Mesoderm
 C. Endoderm
 B. Epiderm
 D. Ectoderm

KIPS Unit-9

Diversity among Animals

- Q.14 It is an endoparasite of humans, cattle, and pigs that completes its life cycle in two hosts:
 A. Tapeworm
 C. Aurelia
 B. Liver fluke
 D. Planaria
- Q.15 Tse-Tse fly causes sleeping sickness and skin diseases by transmitting:
 A. Plasmodium
 C. Trypanosoma
 B. Anopheles
 D. Insects
- Q.16 Book lungs are present in arthropods for the exchange of gases in class:
 A. Crustacea
 C. Insecta
 B. Myriapoda
 D. Arachnida
- Q.17 A parasite living inside the body of the host is called:
 A. Ectoparasite
 C. Obligate parasite
 B. Facultative parasite
 D. Endoparasite
- Q.18 Which of the following is the exclusive character of mammals?
 A. Homothermic
 C. Hair
 B. Poikilothermic
 D. Four chambered heart
- Q.19 Fasciola is endoparasite of:
 A. Colon
 C. Liver
 B. Small Intestine
 D. Bile Duct
- Q.20 Trypanosoma is transmitted in human beings by:
 A. Plasmodium
 C. Anopheles
 B. House Fly
 D. Tsetse Fly
- Q.21 During development, in an animal, the mesoderm layer gives rise to:
 A. Nervous System
 C. Alimentary canal lining
 B. Muscular and skeletal system
 D. Mouth
- Q.22 Fasciola is the name given to:
 A. Tapeworm
 C. Planaria
 B. Liver fluke
 D. Earthworm
- Q.23 Polymorphism is a characteristic feature of:
 A. Porifera
 C. Cnidaria
 B. Annelida
 D. Nematodes
- Q.24 Sleeping sickness in humans is caused by:
 A. Trypanosoma
 C. Plasmodium
 B. Anopheles
 D. Andes
- Q.25 The cavity between the body wall and the alimentary canal is:
 A. Coelom
 C. Mesoderm
 B. Endoderm
 D. Mesoglea
- Q.26 The excretory system in Platyhelminthes is in the form of:
 A. Flame cells
 C. Malpighian tubules
 B. Metanephridium
 D. Kidneys
- Q.27 Amphibians evolved from:
 A. Cartilaginous fishes
 C. Dipnoi
 B. Reptiles
 D. Cyclostomata
- Q.28 Amnion is not present around the embryo of:
 A. Reptiles
 C. Birds
 B. Amphibian
 D. Mammals

KIPS Unit-9

- Q.29 In _____ both ovaries and oviducts are functional.
 A. Robin
 B. Kestrel
 C. Eagle
 D. Kingfisher
- Q.30 *Archaeopteryx* is a connecting link between:
 A. Reptiles & mammals
 B. Reptiles & birds
 C. Birds & mammals
 D. amphibian and fishes
- Q.31 In some coelenterates there are special feeding Zooids which are called _____ which perform only the function of nutrition for the whole colony:
 A. Gonozooids
 B. Gastrozooids
 C. Astrozoids
 D. Medusazoids
- Q.32 *Ascaris* is the endoparasite of:
 A. Small intestine
 B. Large intestine
 C. Rectum
 D. Appendix
- Q.33 One of the reasons for the success of phylum Arthropoda is its:
 A. Large variety of organism
 B. Malpighian tubules
 C. Chitinous exoskeleton
 D. Spiracles
- Q.34 Pigment cells called chromatophores are present in:
 A. Reptiles
 B. Amphibian
 C. Chondrichthyes
 D. Mammals
- Q.35 The mammal-like reptile that was found as a fossil in Texas:
 A. *Archaeopteryx*
 B. *Duckbill platypus*
 C. *Varanope*
 D. *Opossum*
- Q.36 The most important function of suckers is:
 A. Absorption of blood
 B. Attachment
 C. Ingestion of food
 D. Excretion of waste
- Q.37 The animals of the phylum _____ are known as schizocoelous.
 A. Arthropoda
 B. Echinodermata
 C. Porifera
 D. Chordata
- Q.38 All of the following have no swim bladder except:
 A. Cyclostomes
 B. Chondrichthyes
 C. Osteichthyes
 D. Amphibians
- Q.39 _____ is a common feature of all mammals.
 A. Viviparous
 B. Have placenta
 C. Right aortic arch
 D. Mammary glands
- Q.40 Which phylum does not show tissue level of organization?
 A. Nematoda
 B. Coelenterata
 C. Porifera
 D. Echinodermata
- Q.41 What is false about the closed circulatory system?
 A. Blood pressure is high and regular
 B. Amount of blood is limited
 C. Blood circulates through arteries, veins, and capillaries
 D. Blood pressure is low and irregular
- Q.42 Water vascular system is found in
 A. Mollusca
 B. Annelida
 C. Arthropoda
 D. Echinodermata

KIPS Unit-9

- Q.43 1. Fertilization _____
 2. Digestive system _____
 3. Excretion by _____



Fill in the blanks for the organism given in the above figure.

- A. Internal, Blind end, rennet cells
 B. External, Tube-like, nephridia
 C. Internal, Saclike, flame cells
 D. External, Saclike, protonephridia

Q.44 Match the following:

Column I

- A. *Ascaris*
 B. Octopus
 C. *Ancylostoma*
 D. *Pheretima*
 A. A-2, B-4, C-3, D-1
 C. A-1, B-2, C-3, D-4

Column II

1. Intestinal round worm
 2. Mollusca
 3. Hook worm
 4. Earth worm
 B. A-4, B-3, C-1, D-2
 D. A-2, B-1, C-4, D-3

Q.45 Select from the following the total number of an organism that belongs to the phylum Arthropoda.
Locust, Butterfly, Scorpion, Prawn, Crab, Lobster, Mosquitoes, Leech, Earthworm, Land snail, Wasp.

- A. 3
 B. 8
 C. 5
 D. 11

Q.46 Which of the following characters do not belong to Birds?

- A. Presence of feathers
 B. Presence of gills
 C. Beak
 D. Sternum

Q.47 Four chambered heart is present in:

- A. Frog
 B. Crocodiles
 C. Snake
 D. Turtle

Q.48 Saliva in leech contains as anti-coagulant called:

- A. Hirudin
 B. Antihistamine
 C. Heparin
 D. Ptyalin

Q.49 Kangaroo is a:

- A. Eutherian
 B. Bird
 C. Prototherian
 D. Metatherian

Q.50 Frogs differ from humans in possessing:

- A. Paired cerebral Hemispheres
 B. Nucleated red blood cells
 C. Hepatic portal system
 D. Presence of endocrine tissues

ANSWER KEY

1	D	11	C	21	B	31	B	41	D
2	D	12	A	22	B	32	A	42	D
3	D	13	A	23	C	33	C	43	C
4	A	14	A	24	A	34	B	44	C
5	A	15	C	25	A	35	C	45	B
6	C	16	D	26	A	36	D	46	B
7	C	17	D	27	C	37	A	47	B
8	A	18	C	28	B	38	A	48	A
9	B	19	D	29	C	39	D	49	D
10	C	20	D	30	B	40	C	50	B

10
UNITVARIATIONS & GENETICS/INHERITANCE
EVOLUTION

SELF ASSESSMENT TEST

- Q.1 All the alleles present in the gametes of a sexually reproducing population are known as the population's _____.
- A. Gene frequency
B. Genome
C. Gene pool
D. Genotype
- Q.2 An interaction between two alleles having a single locus for a single trait can be labeled as:
- A. Pleiotropy
B. Dominance
C. Epistasis
D. Polygene
- Q.3 The majority of hemophilic patients suffer from deficiency of:
- A. Factor VII
B. Factor IX
C. Factor VIII
D. Factor XI
- Q.4 XXY in humans is a:
- A. Sterile male
B. Fertile male
C. Sterile female
D. Fertile female
- Q.5 Alleles in an individual for a particular trait are called its:
- A. Phenotype
B. Gene pool
C. Genotype
D. Karyotype
- Q.6 Keeping in view the Mendel's law of Segregation, if tall plants were crossed with short heighted plants, then which of the following best describes the F_1 Progeny?
- A. Homozygous and tall heightened
B. Heterozygous and tall heightened
C. Homozygous and short heightened
D. Heterozygous and short heightened
- Q.7 Which one might be the blood group of an individual with the following genetic makeup, " $L^M L^N, I^A i, Dd, hh$ "?
- A. Phenotypically MN, O, and positive
B. Phenotypically MN, A, and negative
C. Phenotypically MN, A and positive
D. Phenotypically MN, O and negative
- Q.8 Hemophilia is a sex-linked _____ trait.
- A. Recessive
B. Codominant
C. Dominant
D. Pleiotropic
- Q.9 All altered alternative forms of a gene, whose number is more than two are called:
- A. Co-dominant alleles
B. Jumping genes
C. Multiple alleles
D. Homozygous
- Q.10 The haploid chromosome number in pea is:
- A. 8
B. 10
C. 7
D. 14
- Q.11 A test cross distinguishes between:
- A. 2 homozygous forms
B. Homozygous recessive and heterozygous form
C. 2 heterozygous forms
D. A homozygous dominant and heterozygous form
- Q.12 The most prevalent abnormality of blood clotting factor is of:
- A. VII
B. IX
C. VIII
D. X

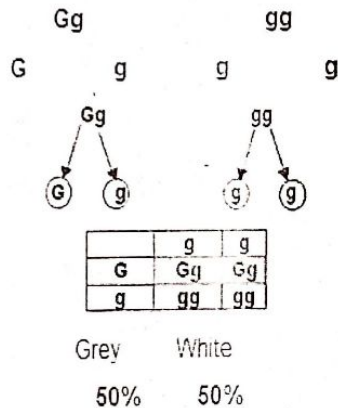
- Q.13 A girl has blood group A and her brother has blood group B. Which combination of genotypes cannot belong to their parents:

	Mother	Father
A.	I ^A i	I ^B i
B.	I ^A I ^B	I ^A I ^B
C.	ii	I ^A I ^B
D.	ii	I <i>A</i> iO

- Q.14 The basic unit of biological information is:
 A. Gene
 B. Locus
 C. Chromosome
 D. Allele
- Q.15 A true-breeding variety upon self-fertilization always produces:
 A. Only dominant offspring
 B. Only recessive offspring
 C. Both with ratio 3:1
 D. Offspring identical to the parents
- Q.16 Gene linkage is:
 A. Physical relation of genes
 B. Physiological relation
 C. Both of these
 D. None of these
- Q.17 Which of the following trait is not X-linked?
 A. Colour blindness
 B. Diabetes insipidus
 C. Haemophilia
 D. Leukemia
- Q.18 In *Drosophila* male determining genes are located on:
 A. X chromosome
 B. Y chromosome
 C. Autosomal chromosomes
 D. Both on X and Y chromosomes
- Q.19 Which one of the traits zigzags from maternal grandfather through a carrier daughter to a grandson?
 A. Autosomal
 B. X-linked recessive
 C. Y-linked dominant
 D. X-linked dominant
- Q.20 What are the chances of a hemophilic son, whose mother is a carrier but father is normal?
 A. 0%
 B. 75%
 C. 25%
 D. 50%
- Q.21 A trait that passes directly from father to son:
 A. Colour blindness
 B. Maleness
 C. Ichthyosis
 D. Hemophilia
- Q.22 Origin of life is explained by all except:
 A. Endosymbiont hypothesis
 B. Creationism
 C. Hydrothermal vent hypothesis
 D. Chemical evolution
- Q.23 Scientists who first time presented the concept of evolution with evidence:
 A. Aristotle
 B. Lamarck
 C. Linnaeus
 D. Darwin
- Q.24 In different species, analogous organs evolve to adapt:
 A. Same habitat
 B. Same nutrition
 C. Different habitat
 D. Different ecosystem

- Q.25 According to Lamarck, evolution is a cumulative product of:
 A. Somatic changes
 B. Heritable variations
 C. Genetic changes
 D. Natural selection
- Q.26 The one who believed in the theory of special creation is:
 A. C. Linnaeus
 B. Mendel
 C. Lamarck
 D. Lyell
- Q.27 The present giraffe has a long neck as compared to its ancestors. Darwin believed it could be due to:
 A. Natural selection
 B. Isolation
 C. Inheritance of acquired characters
 D. Migration
- Q.28 For evolutionary success, mutations must occur in:
 A. Somatic RNA
 B. Somatic DNA
 C. Germ cell DNA
 D. Germplasm RNA
- Q.29 Which of the following concept is attributed to Charles Darwin?
 A. Use and disuse of organs is of great importance in the evolution
 B. Every cell must come from a pre-existing cell
 C. In the struggle for existence, the fittest would survive
 D. The gametes will carry only one of a pair of contrasting characters.
- Q.30 In which rocks most fossils are found?
 A. Metamorphic
 B. Sedimentary
 C. Igneous
 D. All A, B, C
- Q.31 Which of the following is not examples of analogous structure?
 A. Wings of bats and butterfly
 B. Thorn and spine
 C. Wings of bats and forelimb of cattle
 D. Wings of bats and sparrow
- Q.32 There is _____ number of linkage groups in humans.
 A. 22
 B. 23
 C. 80
 D. 80
- Q.33 Product of evolution is:
 A. Ecosystem
 B. Species
 C. Community
 D. Biome
- Q.34 According to Darwin, finches found on Galapagos island had distinct characteristics due to:
 A. Geographical isolation
 B. Special creation
 C. Developmental anomaly
 D. Inheritance of acquired characteristics
- Q.35 Neo Darwinism is the result of the reconciliation of Darwin's theory with:
 A. Lamarck's work
 B. Lyell's work
 C. Cuvier's work
 D. Mendel's work
- Q.36 Which of the following branch first suggested the idea of evolution to Darwin?
 A. Zoogeography
 B. Phytogeography
 C. Biogeography
 D. Geography
- Q.37 Which of the following animal lives only in America?
 A. Kangaroo
 B. White rat
 C. Armadillos
 D. American python

- Q.38 The similarity between the forelimbs of cats, whales, bats, and other mammals show that they are:
 A. Monophyletic
 B. Polyphyletic
 C. Paraphyletic
 D. Diphyletic
- Q.39 Which of the following is not the vestigial structure?
 A. Ear of humans
 B. Goosebumps
 C. 3rd molar of humans
 D. Vermiform appendix
- Q.40 This structure is common in all vertebrates at embryonic stages:
 A. Gill pouches
 B. 4 chambered heart
 C. Teeth
 D. Gills
- Q.41 When a true-breeding pea plant that has yellow seeds is pollinated by a plant that has green seeds, then all the F₁ plants have yellow seeds. This means that the allele for yellow is:
 A. Heterozygous
 B. Recessive
 C. Dominant
 D. Lethal
- Q.42 The below diagram represents:



- A. Back cross
 B. Test cross
 C. Outcross
 D. Dihybrid cross
- Q.43 Probability of which of the following is extremely rare?
 A. Carrier female in hemophilia
 B. Affected male in hemophilia
 C. Carrier male in hemophilia
 D. Affected female in hemophilia
- Q.44 Select the false statement from the following:
 A. Big bang theory is used to explain the origin of the universe
 B. Expansion of the universe after the explosion led to a decrease in temperature
 C. Gases condensed under gravitation and formed galaxies
- Q.45 Variation may be due to:
 A. Mutation
 B. Genetic recombinant during gametogenesis
 C. Gene flow or genetic drift
 D. All A, B, C
- Q.46 The basic idea of evolution is:
 A. Cosmic evolution
 B. Spontaneous generation
 C. Special creation
 D. Descent with modification

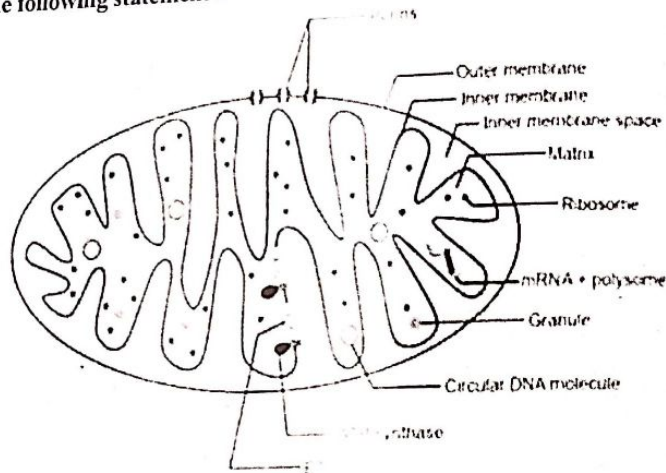
- Q.47 Survival of the fittest is possible due to:
 A. Overproduction
 B. Environmental changes
 C. Favorable variations
 D. Inheritance of acquired characters
- Q.48 The processes of _____ generate variation and _____ produce adaption to the environment.
 A. Sexual selection, natural selection, mutation
 B. Genetic drift, mutation, sexual recombination
 C. Mutation, sexual recombination, genetic drift
 D. Mutation, sexual recombination, natural selection
- Q.49 Which type of evolution is shown by the wings of bats, mosquitoes, and pigeons?
 A. Divergent
 B. Convergent
 C. Atavism
 D. Vestigial organs
- Q.50 The genotype of an individual is RrAa. How many different types of gametes will it produce based on the law of independent assortment?
 A. 16
 B. 8
 C. 9
 D. 4

ANSWER KEY

1	C	11	D	21	B	31	C	41	A
2	B	12	C	22	A	32	B	42	B
3	C	13	D	23	D	33	B	43	D
4	A	14	A	24	A	34	A	44	C
5	C	15	D	25	A	35	D	45	D
6	B	16	A	26	A	36	C	46	D
7	A	17	D	27	A	37	C	47	C
8	A	18	C	28	C	38	A	48	D
9	C	19	B	29	C	39	A	49	B
10	C	20	D	30	B	40	A	50	D

POST-PREP TEST

- Q.1 For the synthesis of hexokinase, it binds with mRNA first:
 A. 60S B. 50S
 C. 40S D. 30S
- Q.2 Contractile vacuoles are present in:
 A. Freshwater protists B. Marine water protists
 C. Land protists D. Aerial protists
- Q.3 Which of the following statement is true for an organelle shown below?



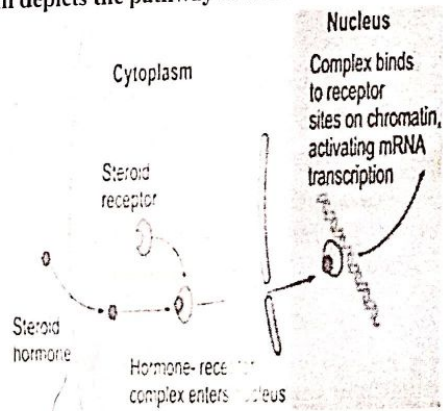
- A. Helps in the transportation of material across cell
 B. Regenerates ATP by chemiosmosis
 C. Performs glycosylation
 D. Is involved in autophagy
- Q.4 Nucleoplasm does not contain:
 A. Histones B. Lactate dehydrogenase
 C. RNA polymerase D. Magnesium ions
- Q.5 The nature of the plasma membrane is:
 A. Glycoprotein B. Lipoprotein
 C. Glycolipids D. Nucleoprotein
- Q.6 In Golgi apparatus, cisternae are thought to be moving from ____ to ____ face:
 A. Inner, outer B. Medial, lateral
 C. Concave, convex D. Convex, concave
- Q.7 The most abundant organic molecule on the planet earth is:
 A. Starch B. Glucose
 C. Glycogen D. Cellulose
- Q.8 Which of these types of carbohydrates are rare in nature?
 A. Monosaccharides B. Tetroses
 C. Polysaccharides D. Pentoses
- Q.9 Cellulase is a cellulose digesting enzyme secreted by certain:
 A. Herbivores B. Animals
 C. Bacteria D. Plants

- Q.10 Ribonuclease is a:
 A. Protein B. Nucleic acid
 C. Carbohydrate D. Lipid
- Q.11 $C_{14}H_{26}O_{13}$ involves formation of two:
 A. Hexoses B. Heptoses
 C. Pentoses D. Maltose
- Q.12 Peptidyl transferase helps in the formation of:
 A. Peptide bond B. Hydrogen bond
 C. Ionic bond D. Hydrophobic interactions
- Q.13 Which of the following has the lowest melting point?
 A. A fatty acid of 16 carbons with no double bond
 B. A fatty acid of 18 carbons with no double bond
 C. A fatty acid of 18 carbons with 2 double bonds
 D. A fatty acid of 18 carbons with 1 double bond
- Q.14 An RNA nucleotide is:
 A. dGTP B. AMP
 C. Uridine D. Cytosine
- Q.15 Glycolysis and fermentation take place in the:
 A. Mitochondria and cytoplasm respectively B. Mitochondria
 C. Cytoplasm and mitochondria respectively D. Cytoplasm
- Q.16 Photophosphorylation occurs in:
 A. Chloroplast B. Ribosome
 C. Mitochondria D. Both A and B
- Q.17 Which is not required for the Tricarboxylic acid cycle?
 A. NAD^+ B. FAD^+
 C. $NADPH_2$ D. GDP
- Q.18 CO_2 fixation occurs at/in:
 A. Thylakoid B. F_1 -particles
 C. Matrix D. Stroma
- Q.19 Why is RuBP important in the process of photosynthesis?
 A. It is an acceptor molecule for CO_2 B. It is an acceptor for H^+
 C. It is a source of H^+ ions D. It is an intermediate in sucrose formation
- Q.20 A bacterial cell swells and bursts during the lytic cycle because it:
 A. No longer can synthesize proteins
 B. No longer has an intact chromosome
 C. No longer has an intact cell wall to counter osmosis
 D. Has greater osmotic pressure due to catabolism of glycogen
- Q.21 Which type of parasite a bacteriophage is?
 A. Obligate intracellular parasite B. Intercellular parasite
 C. Facultative parasite D. Cellular parasite
- Q.22 Lysozyme is used to dissolve:
 A. Viral capsid B. Bacterial cell membrane
 C. Bacterial cell wall D. Bacterial envelope
- Q.23 The bacterial chromosome is composed of:
 A. DNA only B. Proteins only
 C. DNA and histone D. RNA and histone
- Q.24 Which of the following bacteria are without cell walls?
 A. *Mycoplasma* B. Gram negative bacteria
 C. Gram-positive bacteria D. Archaeobacteria

- Q.25 Which one of the following is similar to fungi and animals?
 A. Presence of chitin
 B. Presence of centrioles
 C. Nuclear mitosis
 D. Absence of cell wall
- Q.26 Gall bladder is involved in:
 A. Synthesis of bile
 B. Concentration of bile
 C. Digestion of carbohydrates
 D. Haemopoiesis
- Q.27 Maximum absorption of food occurs in:
 A. Buccal cavity
 B. duodenum
 C. Jejunum
 D. Ileum
- Q.28 54ml/100 of Carbon dioxide is present in:
 A. Pulmonary vein
 B. Coronary artery
 C. Umbilical vein
 D. Umbilical artery
- Q.29 Outward movement of bicarbonate ions across R.B.C is balanced by inward movement of _____ ions:
 A. Sodium
 B. Potassium
 C. Chloride
 D. Magnesium
- Q.30 Movement of sucrose from companion cells to sieve tube cells is by:
 A. Osmosis
 B. Diffusion
 C. Active transport
 D. Facilitated diffusion
- Q.31 Most important pathway for transport of water and minerals from soil to xylem vessels is:
 A. Apoplast pathway
 B. Symplast pathway
 C. Vacuolar pathway
 D. Imbibition
- Q.32 T wave shows:
 A. Atrial depolarization
 B. Ventricular repolarization
 C. Atrial repolarization
 D. Ventricular depolarization
- Q.33 Arteries that supply oxygenated blood to heart:
 A. Iliac arteries
 B. Femoral arteries
 C. Brachial arteries
 D. Coronary arteries
- Q.34 An artery that carries deoxygenated blood:
 A. Hepatic artery
 B. Mesenteric artery
 C. Umbilical artery
 D. Carotid artery
- Q.35 A test to diagnose abnormalities in rhythmicity and conduction system of the heart is:
 A. ECG
 B. EMG
 C. EEG
 D. EGG
- Q.36 Transfer of immunity by anti-tetanus injection is:
 A. Natural active immunity
 B. Artificial active immunity
 C. Natural passive immunity
 D. Artificial passive immunity
- Q.37 Antibodies are produced by:
 A. B cells
 B. Plasma cells
 C. Memory cells
 D. T cells
- Q.38 An example of spinal reflex actions:
 A. Salivation
 B. Sneezing
 C. Knee jerk
 D. Blinking
- Q.39 It is an example of an excitatory neurotransmitter:
 A. Acetylcholine
 B. GABA
 C. Glycine
 D. Endorphins
- Q.40 A similarity between cartilage and bone:
 A. Presence of collagen
 B. Mineral deposition
 C. Blood vessels presence
 D. Types of cells

- Q.41 Ball and socket joint involves:
 A. Distal end of humerus
 B. Proximal end of the femur
 C. Proximal end of tibia
 D. Distal end of the fibula
- Q.42 An autoimmune disorder is:
 A. Osteoarthritis
 B. Gouty arthritis
 C. Rheumatoid arthritis
 D. Spondylitis
- Q.43 Which of the following is not related to cardiac muscles?
 A. Branching appearance
 B. Pumps blood
 C. Irregular stripes
 D. Location is visceral
- Q.44 It is not present in the sarcoplasm of skeletal myocytes:
 A. Creatine phosphate
 B. Hemoglobin
 C. Myoglobin
 D. Glycogen
- Q.45 During contraction of skeletal muscle, movement of calcium ions is from:
 A. SR to sarcoplasm
 B. Sarcoplasm to SR
 C. E.C.F to sarcoplasm
 D. SR to E.C.F
- Q.46 The degree of muscle contraction depends upon a number of:
 A. Muscle fibers
 B. Myofilaments
 C. Myofibrils
 D. Muscle bundle
- Q.47 Body temperature is basically under control of the:
 A. Cerebrum
 B. Pons
 C. Cerebellum
 D. Hypothalamus
- Q.48 Menstruation is triggered by an abrupt decline in the levels of:
 A. Estrogen
 B. FSH
 C. Progesterone
 D. LH
- Q.49 The fertilization of ovum takes place in the proximal part of the:
 A. Uterus
 B. Placenta
 C. Oviduct
 D. Vagina
- Q.50 Type of STD in which causative agent attacks on immune system cells is:
 A. Gonorrhoea
 B. AIDS
 C. Herpes simplex
 D. Syphilis
- Q.51 _____ are commonly referred as sex linked traits.
 A. X-linked traits
 B. Y-linked traits
 C. Sex influenced traits
 D. Sex limited traits
- Q.52 Which of the following traits pass in zig zag fashion from parents to offsprings?
 A. X-linked traits
 B. Y-linked traits
 C. Sex influenced traits
 D. Sex limited traits
- Q.53 Haemophilia can be result of
 A. Reduction of blood clotting factors
 B. Malfunctioning of blood clotting factors
 C. Complete absence of blood clotting factors
 D. All A, B, C
- Q.54 How many peptide bonds are present in an insulin molecule?
 A. 50
 B. 48
 C. 49
 D. 51
- Q.55 If a carrier woman for haemophilia is married to a normal man, then all of the following combinations can exist except
 A. $X^{H}X^{H}$
 B. $X^{H}Y$
 C. $X^{H}Y$
 D. $X^{H}X^{h}$

- Q.56 _____ are more common in human males than females.
 A. X-linked dominant traits
 B. Y-linked dominant traits
 C. X-linked recessive traits
 D. Autosomal linked recessive traits
- Q.57 How many chromosomes are present in an onion cell?
 A. 14
 B. 18
 C. 16
 D. 26
- Q.58 Progesterone is secreted by:
 A. Corpus luteum
 B. Ripening follicles
 C. Uterine epithelium
 D. Fertilized egg
- Q.59 All enzymes are _____.
 A. Fibrous proteins
 B. Lipoproteins
 C. Low molecular weight protein
 D. Globular Proteins
- Q.60 Cardiac Cycle lasts about:
 A. 0.8 sec
 B. 0.1 sec
 C. 0.4 sec
 D. 0.5 sec
- Q.61 The wings of a bird and the fore-legs of a horse are _____ structures.
 A. Analogous
 B. Vestigial
 C. Homologous
 D. Evolutionary convergent
- Q.62 The first simplest oxygen producing organism:
 A. Methanogens
 B. Euglena
 C. Cyanobacteria
 D. Spirogyra
- Q.63 Ear muscles in man and goat are examples of
 A. Divergent evolution
 B. Convergent evolution
 C. Line evolution
 D. Web evolution
- Q.64 Which part of brain maintains equilibrium?
 A. Cerebrum
 B. Cerebellum
 C. Hypothalamus
 D. Pons
- Q.65 Activation of parasympathetic nervous system leads to:
 A. Bladder contraction
 B. Pupil dilation
 C. Heartbeat acceleration
 D. Peristalsis inhibition
- Q.66 The following diagram depicts the pathway of which hormone:



- A. Growth hormone
 B. Epinephrine
 C. Oxytocin
 D. Estrogen

- Q.67 During evolution, humans have developed a unique antigen-antibody system in ABO blood group system. Keeping that in view, a person having blood group B can donate blood to:
 A. Persons having blood groups A and B
 B. Persons having blood groups A and O
 C. Persons having blood group B and AB
 D. Persons having blood groups O and B
- Q.68 Gene linkage reduces:
 A. Crossing over
 B. Recombination
 C. Variations
 D. ALL A, B, C

ANSWER KEY

1	C	11	B	21	A	31	A	41	B	51	A	61	C
2	A	12	A	22	C	32	B	42	C	52	A	62	C
3	B	13	C	23	A	33	D	43	D	53	A	63	B
4	B	14	B	24	A	34	C	44	B	54	A	64	B
5	B	15	D	25	A	35	A	45	A	55	C	65	B
6	D	16	A	26	B	36	D	46	C	56	C	66	A
7	D	17	C	27	D	37	B	47	D	57	C	67	D
8	B	18	D	28	D	38	C	48	C	58	A	68	C
9	C	19	A	29	C	39	A	49	C	59	D	69	D
10	A	20	C	30	B	40	A	50	B	60	A		