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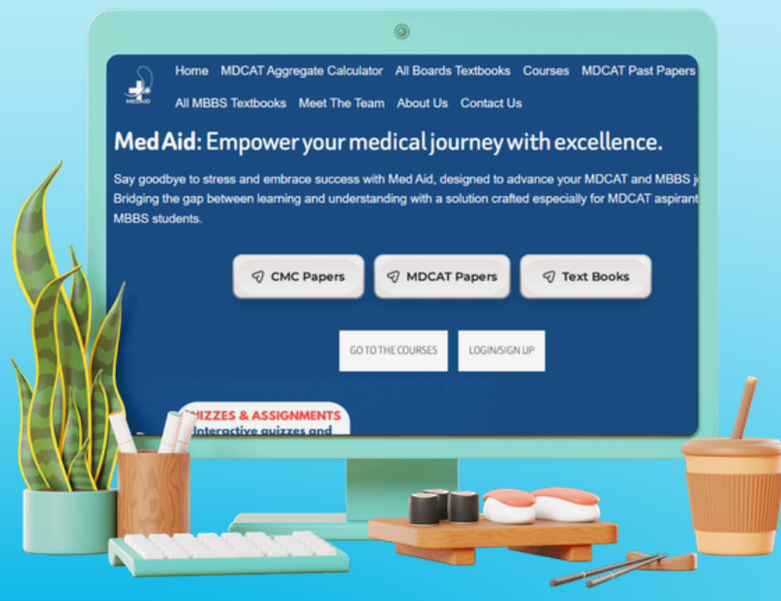


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# BIOLOGY NMDCAT
# 1050 MCQs
# As Per PMC Syllabus 2022



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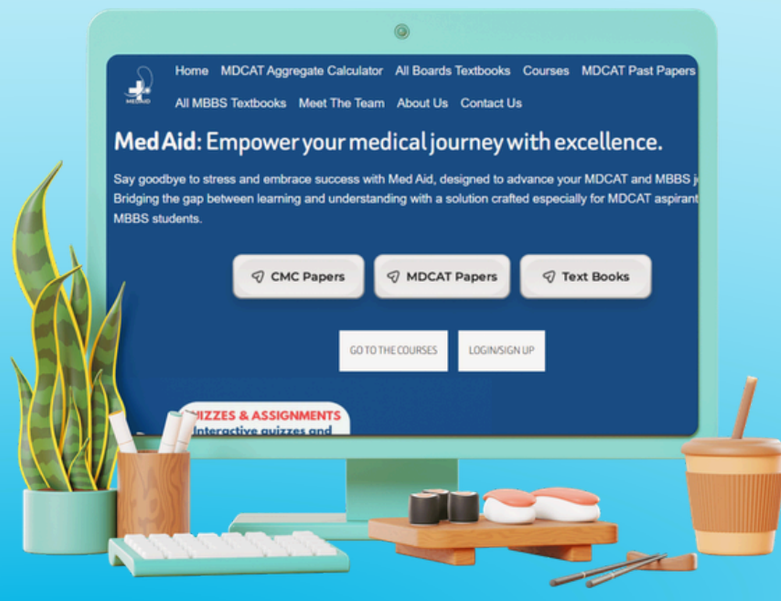


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# CELL STRUCTURE AND FUNCTION

## Introduction to Cell, Comparison Between Typical Plant and Animal Cell

**Q.1 The components of cells including its organelles can be separated by a process called:**

A. Gel electrophoresis
B. X-rays diffraction
C. Cell fractionation
D. Homogenization

**Q.2 The cells of plants and animals can be distinguished by the presence or absence of:**

A. Nucleus
B. Mitochondria
C. Cell wall
D. Vacuole

**Q.3 A structure that is commonly present in both plant and animal cells is:**

A. Centriole
B. Peroxisomes
C. Glyoxysomes
D. Lysosome

**Q.4 Which of the following structures is not found in an animal cell?**

A. Microbodies
B. Heterochromatin
C. Plasmodesmata
D. Microfilaments

**Explanation**

**Q.5 _____is the smallest unit that can carry out all activities of life.**

A. Biological molecule
B. Cell
C. Organelle
D. Organ

**Q.6 Which of the following correctly orders the cellular components by size from largest to smallest?**

A. Nucleus, protein, ribosome, amino acid
B. Nucleus, ribosome, protein, amino acid
C. Protein, nucleus, amino acid ribosome
D. Amino acid, protein, ribosome, nucleus

**Q.7 Most of the plant cells do not have:**

A. Cell wall, nucleus & vacuole
B. Lysosome, peroxisomes & glyoxysomes
C. Centriole, cytoskeleton & peroxisomes
D. Flagellum, centriole & lysosome

**Q.8 Phagocytosis is the common character of:**

A. Plant cell
B. Animal cell
C. Bacterial cell
D. All A, B, C

**Q.9 A human cheek cell and a spongy mesophyll cell from a leaf are examined under a microscope. The structures observed common in both are:**

A. Cell membrane, nucleus and cytoplasm
B. Cytoplasm, cell wall and cell membrane
C. Cell wall, cell membrane and nucleus
D. Nucleus, cytoplasm and cell wall

**Q.10 Which of the following structures is not found in an animal cell?**

A. Microbodies
B. Heterochromatin
C. Plasmodesmata
D. Microfilaments

## Cell wall, Plasma Membrane

**Q.11 In fungi, cell wall is composed of _____, while in bacteria, it is composed of_____, respectively.**

A. Chitin, cellulose
B. Peptidoglycan, Murein
C. Chitin, murein
D. Cellulose, pectin

**Q.12 In cell wall, _____ molecules are arranged in criss cross arrangement.**

A. Suberin
B. Cellulose
C. Lignin
D. Silica

**Q.13 According to fluid mosaic model of plasma membrane, protein molecules are:**

A. Sandwiched between lipid layers
B. Layered around lipids
C. Embedded like mosaic
D. Present only on surface of lipids

**Q.14 Which of the following would be least likely to diffuse through a lipid bilayer?**

A. Water
B. Oxygen
C. Carbon dioxide
D. Sodium ions

**Q.15** **_____ is the outermost boundary of most of the plant cells.**

A. Cell membrane
B. Capsule
C. Cell wall
D. Spore coat

**Q.16** **Movement of water molecules from high water potential to low water potential across membrane is:**

A. Diffusion
B. Facilitated diffusion
C. Osmosis
D. Active transport

**Q.17** **All of the following functions are related with cell membrane except:**

A. Regulation of materials
B. Conduction of nerve impulse
C. Protection from osmotic lysis
D. Transport of substances

**Q.18** **Uptake of glucose by a cell from blood is an example of:**

A. Diffusion
B. Facilitated diffusion
C. Active transport
D. Endocytosis

**Q.19** **In unit membrane model, the region of lipid bilayer attached to globular proteins is:**

A. Hydrophobic
B. Hydrophilic
C. Both are attached
D. Central

**Q.20** **Which of these processes require energy from respiration?**
**(Key: ✓ = Energy required; × = Energy not required)**

| | Diffusion | Osmosis |
|---|---|---|
| A. | ✓ | ✓ |
| B. | ✓ | × |
| C. | × | ✓ |
| D. | × | × |

## Cytoplasm and Cell Organelles

**Q.21** **Endoplasmic reticulum contains a system of flattened membrane-bounded sacs which are named as:**

A. Cristae
B. Elementary particles
C. Cisternae
D. Suicidal bags

**Q.22** **The cisternae break up to form Golgi vesicles from:**

A. Smooth endoplasmic reticulum
B. Maturing face of Golgi complex
C. Forming face of Golgi complex
D. Rough endoplasmic reticulum

**Q.23** **Cisternae stacks in Golgi apparatus are continuously formed by the fusion of vesicles, which are probably derived by the budding of:**

A. SER
B. Lysosome
C. RER
D. Peroxisomes

**Q.24** **Lysosomal enzymes are synthesized by:**

A. Free ribosomes
B. RER
C. SER
D. Golgi apparatus

**Q.25** **Glyoxylate cycle is associated with:**

A. Lysosomes
B. Peroxisomes
C. Glyoxysomes
D. Ribosomes

**Q.26** **In plants, _____ is the major contributor to the turgor that provides support for the individual plant cell.**

A. Nucleus
B. Cytoskeleton
C. Vacuole
D. Chloroplast

**Q.27** **A function of eukaryotic cell that occurs in cytoplasm:**

A. Transcription
B. Glycosylation
C. Fermentation
D. Oxidative phosphorylation

**Q.28** **$Mg^{+2}$ ions in ribosome control attachment of:**

A. Smaller subunit with larger subunit
B. Amino-acyl-tRNA with smaller subunit
C. Smaller subunit with mRNA
D. Ribosome with RER

**Q.29** **In any cell, ribosomes can exist in all of the following forms except:**

A. Dispersed in cytoplasm
B. Attached with cell membrane
C. Attached with RER
D. Attached with Golgi bodies

**Q.30** **Which organelle covers main space of the cell?**

A. Mitochondria
B. Endoplasmic reticulum
C. Nucleolus
D. Plastids

## Mitochondria, Plastids

**Q.31** **F1 particles are involved in:**

A. Chemiosmosis
B. Fatty acid metabolism
C. Glycolysis
D. Krebs cycle

**Q.32** **Reactions of Krebs cycle occur in/at _____ of mitochondria.**

A. Outer membrane
B. Inner membrane
C. Outer compartment
D. Inner compartment

**Q.33** **The size and number of mitochondria depends on cell's:**

A. Physical activity
B. Physiological activity
C. Structural activity
D. Photosynthetic activity

**Q.34** **Under compound microscope, mitochondria look like all except:**

A. Lamella
B. Vesicles
C. Rods
D. Filament

**Q.35** **A crista is made up of:**

A. Glycoproteins
B. Glycolipids
C. Lipoproteins
D. Phospholipids

**Q.36** **Mitochondria are absent in:**

A. Green algae and WBC
B. Brown algae and RBC
C. Red algae, RBC and WBC
D. Blue green algae and RBC

**Q.37** **The organelle, which acts as factory of sugar synthesis:**

A. Chloroplast
B. Mitochondria
C. Golgi apparatus
D. Endoplasmic reticulum

**Q.38** **If we separate the cell organelles of a living cell, then which part can be alive?**

A. Ribosome
B. Chloroplast
C. Cell wall
D. ER

**Q.39** **The two types of cellular organelles that are involved in transformation of energy are:**

A. Mitochondria and chloroplast
B. Chromoplast and leucoplast
C. Mitochondria and chromoplast
D. Chloroplast and leucoplast

**Q.40** **Pick an incorrect statement about chloroplast:**

A. Present in all bryophytes
B. Present in all algae
C. Present in all plants
D. Present in all photosynthetic organisms

## Nucleus, Comparison Between Prokaryotic and Eukaryotic cells

**Q.41** **Which of the following cannot be termed as 'mono-nucleate'?**

A. Erythroblasts
B. Osteoblasts
C. Leukocytes
D. Platelets

**Q.42** **It is not a property of nuclear membrane:**

A. Porous in nature
B. Permeable for ribosomal subunits
C. Double membranous
D. Impermeable for water

**Q.43** **Which of the following events will not take place inside a nucleus?**

A. Replication
B. Transcription
C. Translation
D. Mutation

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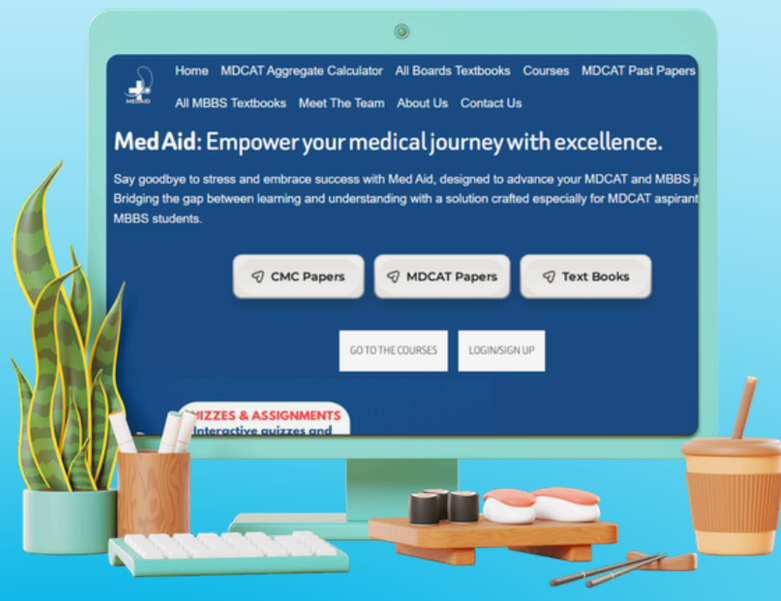


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**Q.44 Large molecular weight rRNA and rDNA are present in which part of nucleolus:**

A. Central granular area
B. Peripheral granular area
C. Central fibril area
D. Peripheral fibril area

**Q.45 Circular DNA is found in:**

A. Bacteria only
B. All viruses
C. Bacteria & chloroplast
D. Chloroplast, bacteria & mitochondria

**Q.46 Genetic material of a prokaryotic cell is found in:**

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

**Q.47 In peptidoglycan cell wall of a bacterial cell, polysaccharide chains are bound to short chains of amino acids through:**

A. Ionic bond
B. Covalent bond
C. Hydrogen bond
D. Peptide bond

**Q.48 Cellular respiration in prokaryotic cells is associated with:**

A. Mitochondria
B. Cristae
C. Cell membrane
D. Cell wall

**Q.49 Regarding cytoplasm of bacterial cell, this is not true:**

A. Its peripheral parts are gel like
B. It lacks membranous organelles
C. It contains single circular DNA
D. It does not show cyclosis

**Q.50 *Mycoplasma* is:**

A. Eukaryotic and unicellular
B. Eukaryotic and multicellular
C. Prokaryotic and unicellular
D. Prokaryotic and multicellular

**Q.51 Most abundant component in plasma membrane are:**

A. Carbohydrates
B. Proteins
C. Lipids
D. Nucleic acids

**Q.52 The only way in which a very large molecule such as a protein could cross a cell membrane is:**

A. Active transport
B. Endocytosis
C. Simple diffusion
D. Facilitated diffusion

**Q.53 Which cell component forms pinocytic vesicles?**

A. Plasma membrane
B. Endoplasmic reticulum
C. Lysosome
D. Ribosome

**Q.54 Which of the following metabolic process is said to occur in the cytoplasm?**

A. Protein glycosylation
B. Pyruvic acid oxidation
C. Glycolysis
D. Oxidation of fatty acids

**Q.55 Consider a protein that is synthesized on the rough endoplasmic reticulum. Which of the following location is not a possible final destination for this protein?**

A. Cytoplasm
B. Extracellular space
C. Endoplasmic reticulum
D. Golgi apparatus

**Q.56 Ribosomes are attached with:**

A. Inner surface of RER
B. Cytoplasmic surface of RER
C. Inner surface of SER
D. Cytoplasmic surface of SER

**Q.57 Eukaryotic ribosomes are composed of RNA and protein in:**

A. 1:1
B. 1:2
C. 2:1
D. 3:1

**Q.58 Ribosomes found in a eukaryotic cell are:**

A. 30S & 50S
B. 40S & 60S
C. 70S & 80S
D. 80S & 100S

**Q.59** **_____ is the factory for ribosome synthesis while _____ is for protein synthesis, respectively.**

A. Nucleus, mRNA
B. RER, ribosome
C. Nucleolus, ribosome
D. Mitochondria, SER

**Q.60** **Which of the following function is performed by both RER and SER?**

A. Synthesis of proteins
B. Detoxification of drugs
C. Transmission of impulses
D. Mechanical support to cell

**Q.61** **In skeletal muscles, the organelles which store and release $Ca^{+2}$ is:**

A. RER
B. Sarcolemma
C. SER
D. Triads

**Q.62** **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 & II only
B. III & IV only
C. I & III only
D. II & III only

**Q.63** **Golgi apparatus consists of stacks of flattened membrane bounded:**

A. Tubules
B. Sacs
C. Vesicles
D. Vacuoles

**Q.64** **Proteins synthesized on ribosomes are converted into glycoproteins in:**

A. Endoplasmic reticulum
B. Lysosomes
C. Microbodies
D. Golgi Complex

**Q.65** **Golgi bodies are absent in:**

A. Erythrocytes
B. Prokaryotes
C. Sieve tube cells
D. All A, B, C

**Q.66** **Golgi complex is involved in the formation of _____.**

A. Lysosomes
B. RER
C. Vacuoles
D. SER

**Q.67** **Lysosomes are present in all of the following type of cells except:**

A. Phagocytes
B. Acinar cells
C. Erythrocytes
D. Hepatocytes

**Q.68** **The diameter of peroxisomes is approximately:**

A. 0.5 mm
B. 0.5nm
C. 0.5 µm
D. 5 µm

**Q.69** **Glyoxysomes are absent in which of the following seed type?**

A. Castor beans
B. Peanuts
C. Soya beans
D. Pea

**Q.70** **Peroxisomes are specifically involved in the formation and decomposition of:**

A. Molecular oxygen
B. Reactive oxygen species
C. Hydrogen peroxide
D. Super-oxide radicals

**Q.71** **It is incorrect about vacuoles found in animals cells:**

A. Relatively small in size
B. Relatively many in number
C. Scattered in cytoplasm
D. Central in position

**Q.72** **Which one of the following is the site of oxidative phosphorylation in mitochondria?**

A. Cristae
B. Matrix
C. Outer membrane
D. Ribosomes

**Q.73 Outer and inner membranes of mitochondria are:**

A. Structurally and functionally similar
B. Structurally and functionally dissimilar
C. Structurally similar but functionally different
D. Structurally different but functionally similar

**Q.74 It is an example of non-membranous organelle:**

A. Vacuole
B. Lysosome
C. Ribosome
D. Peroxisomes

**Q.75 Which one of the following is not found in animal cell?**

A. Nucleus
B. Chloroplast
C. Golgi bodies
D. Mitochondria

**Q.76 In case of plant cells, nucleus is pushed towards periphery due to the presence of:**

A. Mitochondria
B. Vacuole
C. Golgi bodies
D. Endoplasmic reticulum

**Q.77 Biological membrane includes:**

A. Only nuclear membrane
B. Only mitochondrial membrane
C. Only membranes of Golgi complex
D. All the intracellular membranes along with plasma membrane

**Q.78 Transport of materials through charged pores of plasma membrane occurs by:**

A. Active transport
B. Passive transport
C. Carrier mediated transport
D. Both active & passive transport

**Q.79 Which of the following forms extracellular matrix of a cell?**

A. Phospholipids
B. Integral proteins
C. Cytoskeleton
D. Glycoproteins

**Q.80 Lipid molecules of plasma membrane are arranged in _____ manner.**

A. Alternative
B. Parallel
C. Antagonistic
D. Diagonal

**Q.81 Most abundant substance in protoplasm is:**

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

**Q.82 Cisternae are the membranes associated with all of the following except:**

A. Golgi apparatus
B. Lysosomes
C. Peroxisomes
D. Ribosomes

**Q.83 Ribosomes in the chloroplasts of eukaryotic cells are:**

A. The same size and composition as in bacteria
B. Larger than in bacteria, but of similar composition
C. Smaller than in bacteria & different in composition
D. The same size but completely different in composition from the ribosomes in bacteria

**Q.84 Cisternae are the membranes that are associated with:**

A. Non-membranous organelles
B. Single membranous organelles
C. Double membranous organelles
D. All A, B, C

**Q.85 Channels of endoplasmic reticulum are often continuous with:**

A. Nucleus & Golgi apparatus
B. Nucleus & Plasma membrane
C. Plasma membrane & Golgi apparatus
D. Plasma membrane & Mitochondria

**Q.86 Lipids synthesis/metabolism takes place in which of the following organelle?**

A. Mitochondria
B. Vacuoles
C. Rough endoplasmic reticulum
D. Smooth endoplasmic reticulum

**Q.87 Golgi complex consist of:**

A. Golgi Body + SER
B. SER + RER
C. Golgi bodies + Golgi vesicles
D. Golgi bodies + SER vesicles

**Q.88 Accumulation of lipids in brain cells lead to mental retardation and even death. This is about:**

A. Glycogenosis type II disease
B. Tay-Sach's disease
C. Mad-cow infection
D. Mysterious brain infection

**Q.89 Which of the following type of WBCs depend upon lysosomes for killing foreign agents?**

A. Neutrophils
B. Eosinophils
C. B lymphocytes
D. T lymphocytes

**Q.90 Glyoxisomes are most abundant in:**

A. Animals
B. Protozoans
C. Mature plants
D. Plant seedlings

**Q.91 Cell organelle responsible for turgor movement in plants is:**

A. Nucleus
B. Cell wall
C. Cytoplasm
D. Vacuole

**Q.92 Membrane which surrounds the vacuole is called:**

A. Plasmalemma
B. Tonoplast
C. Cell wall
D. Cisternae

**Q.93 Central dogma for genes expression of mitochondrial DNA occurs in:**

A. Nucleus and cytoplasm
B. Mitochondrial matrix and cytoplasm
C. Mitochondrial matrix
D. Cytoplasm

**Q.94 It is mismatched with reference to mitochondrial membrane:**

A. Outer membrane- Smooth
B. Outer membrane – Chemiosmosis
C. Inner membrane - F1 particles
D. Inner membrane - Increases surface area

**Q.95 A mature human red blood cell has no nucleus and a lifespan of 120 days. Based on this information alone, it can be inferred that mature human red blood cells must:**

A. Be metabolically inactive
B. Have ribosomes to compensate
C. Not be able to replicate
D. Contain hemoglobin

**Q.96 Nuclear pores regulate transport of substances between nucleoplasm and cytoplasm. Substances that enter in nucleus are:**

A. mRNA & RNA
B. Ribosomal subunits
C. ATP & enzymes
D. DNA & RNA

**Q.97 A prokaryotic cell divides by:**

A. Mitosis
B. Meiosis
C. Binary fission
D. Multiple fission

**Q.98 Which of the following structures are chemically same in bacterial and eukaryotic cells?**

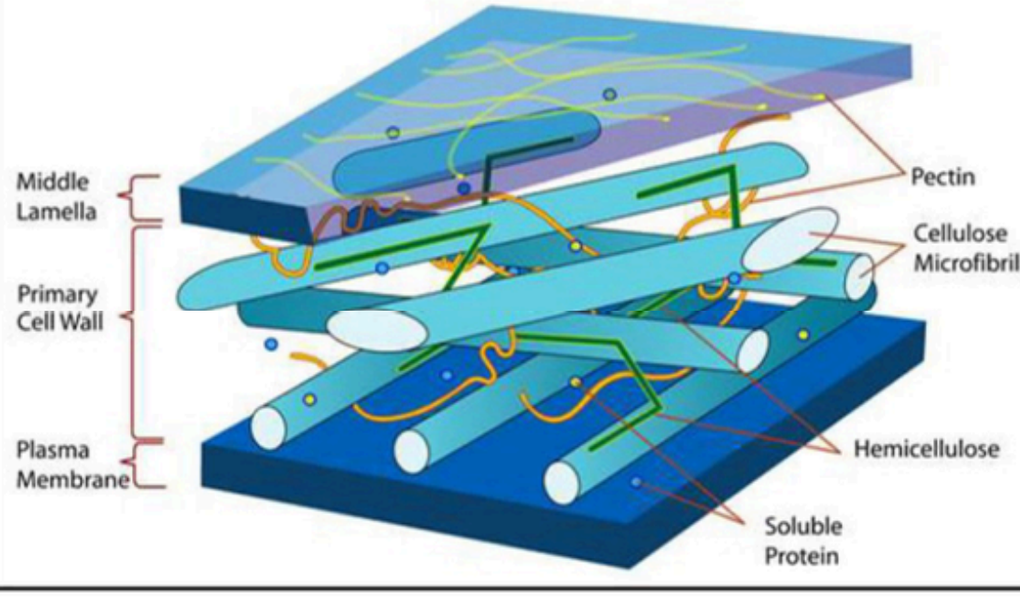
A. Cell membrane
B. Cell wall
C. Flagella
D. Ribosomes

**Q.99 Which feature helps to differentiate prokaryotic cell from eukaryotic cell?**

A. Structure of membranes
B. Composition of membranes
C. Composition of ribosomes
D. Presence of cell wall

**Q.100 What is the similarity between prokaryotic and eukaryotic cell?**

A. Composition of flagella
B. Composition of cell membrane
C. Composition of cell wall
D. Composition of ribosomes

| ANSWWRS & EXPLANTION | | |
|---|---|---|
| **Q.1** | **C** | • Gel electrophoresis is a technique used to separate charged biological molecules like DNA, RNA AND proteins.<br>• X-ray diffraction is the experimental science determining the atomic and molecular structure of a crystal.<br>• Cell fractionation is the process used to separate cellular components while preserving individual functions of each component. |
| **Q.2** | **C** | Cell wall is present in plant cells while absent in animal cells. |
| **Q.3** | **B** | • Centrioles are present in animal cells while absent in plant cells.<br>• Glyoxisomes are present in plant seedlings while absent in animal cells.<br>• Lysosomes are absent in plant cells while present in animal cells. |
| **Q.4** | **C** | Plasmodesmata are found in plant cells only. These are connections/ protoplasmic extensions between adjacent plant cells for transportation. |
| **Q.5** | **B** | Cell is the basic structural and functional unit of life. Organelle is a sub cellular entity and particular organelle can carry out specific functions. |
| **Q.6** | **B** | In cellular organelles ribosomes are smallest while nucleus is largest in size. Ribosomes are composed of rRNA and protein and in turn protein is composed of amino acids. |
| **Q.7** | **D** | Flagella are absent because most of the plant cells are non-motile, lysosomes are absent because most cells do not show phagocytosis and they have structure analogous to centrioles. |
| **Q.8** | **B** | Plant cells and bacterial cells usually do not show phagocytosis due to presence of cell wall. |
| **Q.9** | **A** | • Cell membrane, nucleus and cytoplasm → Present in both<br>• Cytoplasm, cell wall and cell membrane → Cheek cells do not have cell wall<br>• Cell wall, cell membrane and nucleus → Cheek cells do not have cell wall<br>• Nucleus, cytoplasm and cell wall → Cheek cells do not have cell wall |
| **Q.10** | **C** | Plasmodesmata are found in plant cells only. These are connections/protoplasmic extensions between adjacent plant cells for transportation. |
| **Q.11** | **C** | In different organisms, the cell wall is composed of different chemicals. For example, fungal cell wall is composed of chitin, bacterial cell wall is composed of peptidoglycan/murein and plant cell wall mainly composed of cellulose. |
| **Q.12** | **B** |  |

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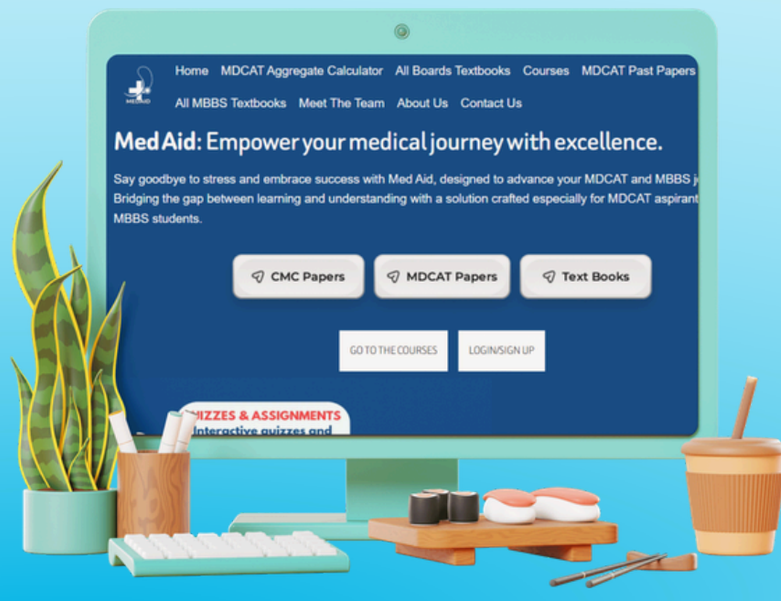


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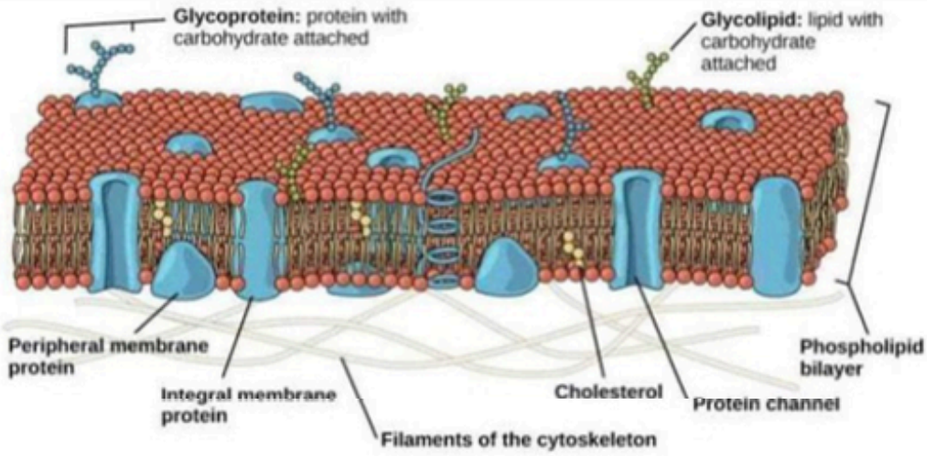
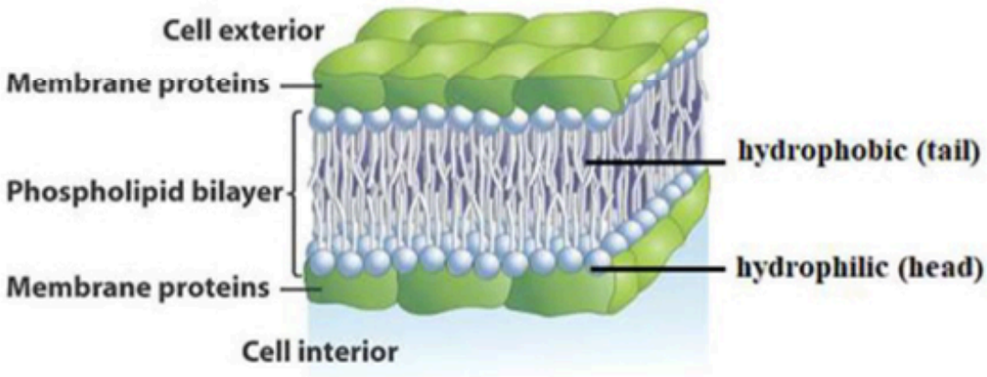
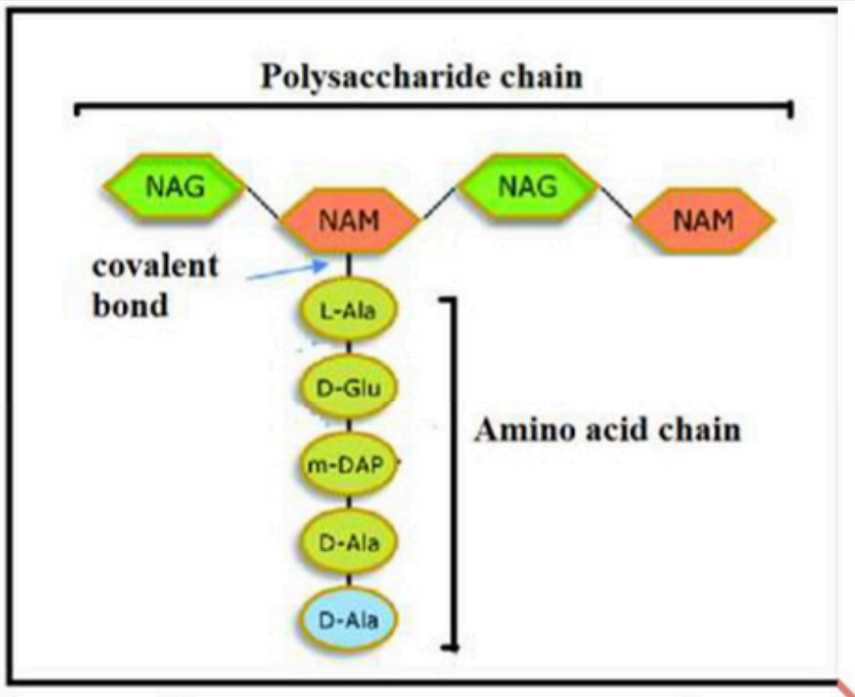
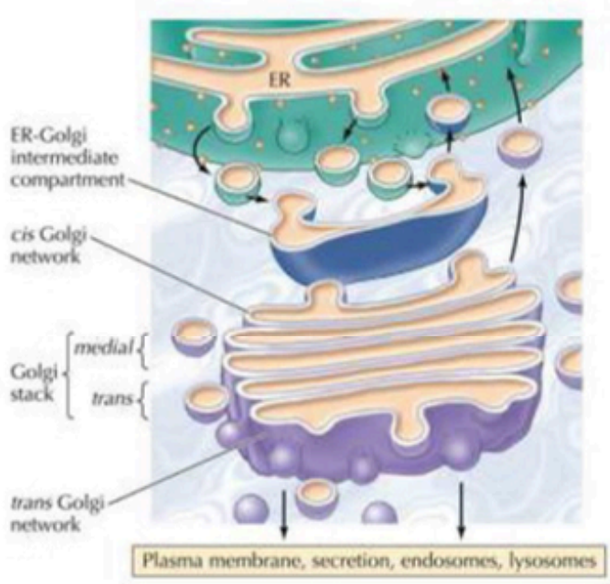
| **Q.13** | **C** |  |
| **Q.14** | **D** | Only lipid soluble substances can cross lipid bilayer. For charged particles, plasma membrane has protein channels. |
| **Q.15** | **C** | Cell membrane is next to cell wall in plant cells. Capsule is usually present around bacterial cells. |
| **Q.16** | **C** | Diffusion is the passive movement of substances with or without membrane while osmosis is only related to passive movement of water molecules and always occurs across a membrane. |
| **Q.17** | | • Protection from osmotic lysis is the function of cell wall.<br>• In neuron and muscle cell, cell membrane conducts nerve impulse. |
| **Q.18** | **B** | Cells have carrier proteins for uptake of glucose from blood. |
| **Q.19** | **B** |  |
| **Q.20** | **D** | Both diffusion and osmosis are example of passive transport which does not need cellular energy. |
| **Q.21** | **C** | • Cristae and elementary /F1 particles are associated with mitochondria.<br>• Suicidal bags are another term used for lysosomes. |
| **Q.22** | **B** | Vesicles from SER combine with convex face to become the part of Golgi apparatus, then after processing of proteins and lipids inside Golgi apparatus (glycosylation), products are packed and budded off from concave (maturing) face of Golgi apparatus to form Golgi vesicles. |
| **Q.23** | **A** | Vesicles that arise from SER fuse to form cisternae for Golgi apparatus. |
| **Q.24** | **B** | These enzymes are formed on RER and then processed and secreted from Golgi apparatus. |
| **Q.25** | **C** | The glyoxylate cycle allows plants to grow on acetate because the cycle by-passes the decarboxylation steps of the citric acid cycle. In plants, these reactions take place in organelles called glyoxysomes. |

| | | |
|---|---|---|
| **Q.26** | **C** | The plant vacuole is the major contributor to the turgor that provides support for the individual plant cell and contributes to the turgidity of the leaves and younger parts of the plants. |
| **Q.27** | **C** | Transcription in nucleus, Glycosylation in Golgi apparatus, while oxidative phosphorylation is the function of mitochondria. Fermentation occurs in cytoplasm. |
| **Q.28** | **A** | • Amino acyl-tRNA is involved in the formation of initiation factor with smaller ribosomal subunit.<br>• For the attachment of smaller ribosomal subunit with mRNA, there is a role of rRNA.<br>• For the attachment of ribosome with RER there is role of ribosomal protein. |
| **Q.29** | **D** | Ribosomes are not attached with Golgi bodies so Golgi bodies do not have role in protein synthesis. |
| **Q.30** | **B** | ER is network of channels extending throughout cytoplasm. |
| **Q.31** | **A** | Mitochondria have double membrane structure in which inner membrane forms infoldings called cristae in mitochondrial matrix. These inner membranes contain particles called oxysomes or elementary particles or F1 particles which contain ATPase (enzyme), so they are involved in ATP synthesis via chemiosmosis. |
| **Q.32** | **D** | Krebs cycle is associated with mitochondrial matrix also called as inner compartment. |
| **Q.33** | **B** | Most active cell in our body is liver cell having about 1000 mitochondria per cell. |
| **Q.34** | **A** | When seen under compound microscope they appear as vesicles, rods, filaments. |
| **Q.35** | **C** | Cristae are infoldings of inner mitochondrial membrane. As the lipoproteins are the major component of all the cellular membranes, so crista is also lipoprotein membrane infoldings. |
| **Q.36** | **D** | Blue green algae are prokaryotes which do not have membrane bounded organelles.<br>RBCs do not contain organelles except for cytoskeleton. |
| **Q.37** | **A** | In a eukaryotic cell the site of photosynthesis is chloroplast which is involved in the synthesis of carbohydrates. |
| **Q.38** | **B** | Chloroplast is semi-autonomous due to presence of DNA. |
| **Q.39** | **A** | Chloroplast transforms light energy into chemical energy while mitochondria from chemical energy stored in organic compounds to ATP. |
| **Q.40** | **D** | Chloroplast is a double membranous organelle, present only in eukaryotic photosynthetic organisms and absent in prokaryotic photosynthetic organisms. |
| **Q.41** | **D** | • Erythroblasts are immature RBCs having single nucleus.<br>• Osteoblasts are bone cells having single nucleus.<br>• Leukocytes have single nucleus which can be lobed or spherical.<br>• Platelets are non-nucleated structures. |
| **Q.42** | **D** | All cellular membranes are permeable to water as per water potential |
| **Q.43** | **C** | Translation occurs in cytoplasm associated with ribosomes. |
| **Q.44** | **C** | Nucleolus is composed of two regions: peripheral granular area containing precursors for ribosomal subunits and central fibril area containing RNA and rDNA. |
| **Q.45** | **D** | Eukaryotic nucleus has linear DNA. All others have circular, except viruses that may have circular or linear DNA. |
| **Q.46** | **B** | As prokaryotic cells do not have membrane bounded nucleus so DNA is submerged in a cytoplasmic region called nucleoid. |

| | | |
|---|---|---|
| Q.47 | B |  <br>**Structure of bacterial cell wall** |
| Q.48 | C | Prokaryotic cells do not have mitochondria. Respiratory chain is associated with plasma membrane. |
| Q.49 | C | Bacterial cytoplasm is throughout gel like so peripheral parts are also gel like.<br>It contains chromatin body and multiple plasmids which are all circular DNA molecules. |
| Q.50 | C | It is a wall-less bacterium and all bacteria are prokaryotes and unicellular. |
| Q.51 | C | • Proteins: 60-80%<br>• Lipids: 20-40%<br>• Carbohydrates: Small amount |
| Q.52 | B | Endocytosis is specific for larger substances which cannot cross plasma membrane by any other mean. |
| Q.53 | A | Pinocytosis and phagocytosis are forms of endocytosis. So, in both cases plasma membrane is involved. |
| Q.54 | C | • The major sites of protein glycosylation in the cells are ER and Golgi body.<br>• The oxidation of pyruvate and fatty acid occur at mitochondrial matrix.<br>• Glycolysis takes place in the cytoplasm. |
| Q.55 | A | Most of the proteins synthesized on RER are transported extracellularly, while most of the proteins synthesized on free ribosomes work intra-cellularly. |
| Q.56 | B | Cisternae in RER have two surfaces. Inner surface is in contact with lumen while outer surface is in contact with cytoplasm where ribosomes are attached. |
| Q.57 | A | Ribosomes are composed of an almost equal amount of rRNA and proteins; hence they are ribonucleo-protein particles. |
| Q.58 | C | • Ribosomes in cytoplasm are 80S.<br>• Ribosomes in mitochondria and chloroplast are 70S. |
| Q.59 | C | Ribosomes are synthesized by nucleolus while proteins are synthesized by ribosomes. |

| | | |
|---|---|---|
| **Q.60** | **D** | • Mechanical support (Both RER and SER)<br>• Synthesis of proteins (RER)<br>• Detoxification of drugs (SER)<br>• Transmission of impulses (SER) |
| **Q.61** | **C** | Sarcoplasmic reticulum (SR) is actually modified form of SER in skeletal muscle fibers which has the ability to store and release $Ca^{+2}$ under the influence of stimulus. |
| **Q.62** | **D** | Insulin and antibodies are proteins. These are synthesized by RER and exported outside through Golgi bodies. |
| **Q.63** | **B** | Golgi apparatus is stack of closed cisternae sacs. |
| **Q.64** | **D** | Golgi complex is involved in modification of molecules. These modifications involve addition of carbohydrates into proteins and lipids forming glycoproteins and glycolipids. |
| **Q.65** | **D** | • Mature RBCs do not contain any organelle except for cytoskeleton.<br>• Prokaryotes do not contain membrane bounded organelles.<br>• Sieve tube cells found in phloem do not contain any organelle. |
| **Q.66** | **A** |  |
| **Q.67** | **C** | Mature RBCs lack nucleus and most organelles. |
| **Q.68** | **C** | Peroxisomes are approximately 0.5µm in diameter. |
| **Q.69** | **D** | Glyoxysomes are the single membranous organelles present only during short period of time e.g. during germination of seeds. These are found predominantly in lipid rich seeds such as castor bean, peanuts and soya beans and absent in lipid-poor seeds such as pea |
| **Q.70** | **C** | The name peroxisome was applied because this organelle is specifically involved in the formation and decomposition of $H_2O_2$ in the cell. |

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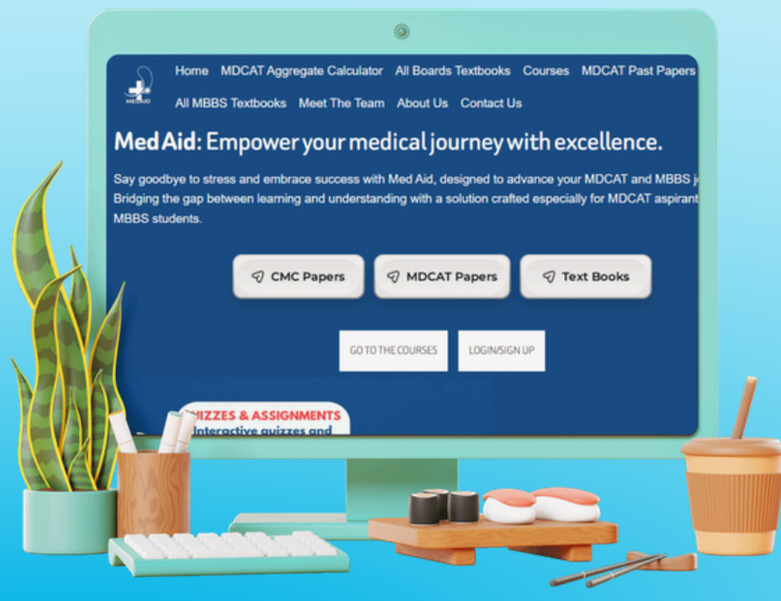


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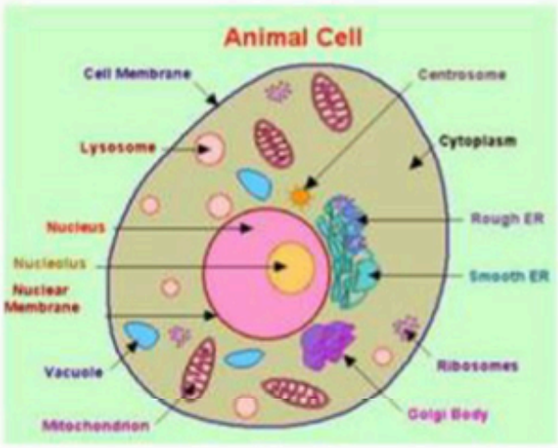
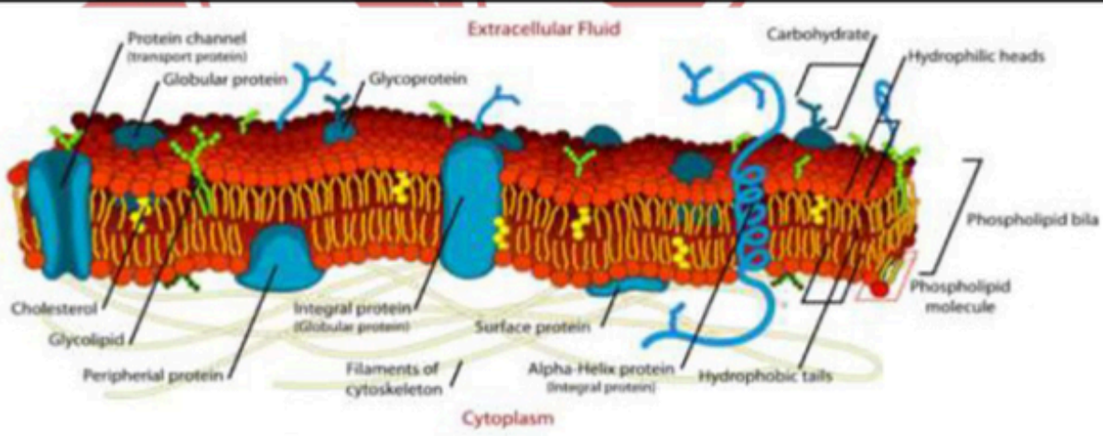
| | | |
|---|---|---|
| Q.71 | D |  |
| Q.72 | A | Respiratory chain is found on cristae that are involved in oxidative phosphorylation. |
| Q.73 | B | The outer membrane has many protein-based pores that are big enough to allow the passage of ions and molecules as large as a small protein. In contrast, the inner membrane has much more restricted permeability, much like the plasma membrane of a cell. |
| Q.74 | C | Vacuole, Lysosomes and Peroxisomes are bounded by a single membrane whereas ribosomes are not bounded by any membrane. |
| Q.75 | B | Chloroplasts are found in plant cells and are involved in photosynthesis. |
| Q.76 | B | Mature plant cell has large central vacuole which pushes nucleus to periphery. |
| Q.77 | D | All cellular membranes are biological membranes. |
| Q.78 | | • Gates are involved in passive transport.<br>• Pumps are involved in active transport. |
| Q.79 | D | Substances found outside plasma membrane constitute extracellular matrix like glycoproteins and glycolipids. |
| Q.80 | B |  |
| Q.81 | D | Water is most abundant in living organisms. |
| Q.82 | D | Ribosomes are non-membranous. |
| Q.83 | A | Chloroplast is considered to be evolved from prokaryotes by endosymbiont hypothesis so have same ribosome. |
| Q.84 | B | Cisternae are found in endoplasmic reticulum, Golgi apparatus, lysosome, peroxisomes and Glyoxisomes. All these are single membranous organelles. |
| Q.85 | B | ER is network of channels that extends between nucleus and plasma membrane. |
| Q.86 | | • Mitochondria are involved in catabolism.<br>• RER is involved in synthesis of proteins. |

| | | |
|---|---|---|
| | | • Vacuole is involved in storage of substances. |
| **Q.87** | **C** | Golgi bodies (cisternae) together with associated vesicles are called Golgi complex. |
| **Q.88** | **B** | It is due to a gene mutation that results in absence of a lysosomal enzyme that is involved in catabolism of lipids. |
| **Q.89** | **A** | Lysosomes are important for phagocytes. In WBCs, neutrophils and macrophages act as phagocytes. |
| **Q.90** | **D** | These are abundant in lipid rich seeds where convert lipids in carbohydrates for energy supply to germination of seedlings. |
| **Q.91** | **D** | Vacuolc has ability to dcvclop turgor prcssurc. |
| **Q.92** | **B** | |
| **Q.93** | **C** | Transcription and translation both in mitochondria occur in mitochondrial matrix. |
| **Q.94** | **B** | Chemiosmosis is associated with inner mitochondrial membrane. Outer membrane is smooth. Inner membrane forms infoldings which increase surface area and also have F1 particles. |
| **Q.95** | **C** | DNA and nucleus are required for replication. |
| **Q.96** | **C** | RNAs and ribosomal subunits are synthesized within nucleus and then move outside. |
| **Q.97** | **C** | Mitosis and meiosis are found in eukaryotic cells. Multiple fission is also shown by eukaryotic cells. Binary fission is simple division of a cell into two. |
| **Q.98** | **D** | Ribosomes are chemically made of rRNA and proteins in both type of cells. Plasma membrane of a bacterial cell lacks sterol while found in eukaryotic cells. Similarly bacterial flagella are made of flagellin protein while eukaryotic flagella of tubulin protein. |
| **Q.99** | **B** | Prokaryotic membranes do not contain sterols while found in eukaryotic membranes. |
| **Q.100** | **D** | • Eukaryotic flagella are made up of tubulin protein while prokaryotic is of flagellin protein.<br>• Eukaryotic cell wall is made up of cellulose (plant) while prokaryotic is of peptidoglycan.<br>• Prokaryotic cell membrane does not have sterols in it, while eukaryotic have.<br>• Ribosomes are made up of equal amount of proteins and rRNA in both. |

# BIOLOGICAL MOLECULES & ENZYMES

## Introduction to biological molecules & Importance of Water

**Q.1 Of the total weight of a bacterial cell, carbohydrates constitute only:**

A. 1% B. 2%
C. 3% D. 4%

**Q.2 18% of the total weight of a mammalian cell is the:**

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

**Q.3 The amount of heat required to raise the temperature of 01g of water by 01 degree:**

A. Specific Heat Capacity B. Heat of vaporization
C. Electronegativity D. Electron affinity

**Q.4 Name the process that involves the breakdown of large molecules into smaller ones utilizing water molecules:**

A. Hydrolysis B. Reduction
C. Oxidation D. Condensation

**Q.5 All of the following are formed through condensation reactions except:**

A. Glucose B. Amylopectin
C. Insulin D. Triglyceride

**Q.6 Ester bond is present in all except**

A. Two nucleotides B. Glycerol and phosphoric acid
C. Glycerol and fatty acid D. Two amino acids

**Q.7 All are uses of water by Living organisms except:**

A. as lubricant & for protection B. as cooling agent & thermo-stabilizer
C. metabolism D. source of energy

**Q.8 Value of heat capacity of water is ____:**

A. 1.0 cal/g B. 10 cal/g
C. 100 kcal/kg D. 574 kcal/kg

**Q.9 What will happen if water content of protoplasm is reduced as low as 10 percent?**

A. Cell will die B. Metabolism will pace up
C. No effect D. Metabolism will slow down

**Q.10 Temperature of water rises and falls more slowly as compared to other liquids due to its _____ property.**

A. Polar nature B. Heat of vaporization
C. Specific Heat D. Ionization

## Carbohydrates

**Q.11 A biochemical test used for detection of reducing sugars is:**

A. Biuret test B. Benedict test
C. Spot test D. Iodine test

**Q.12 All of the following elements are found in all carbohydrates except:**

A. Carbon B. Hydrogen
C. Nitrogen D. Oxygen

**Q.13 Ratio of hydrogen and oxygen in carbohydrates is:**

A. 1:1 B. 2:2
C. 1:2 D. 2:1

**Q.14 General formula of carbohydrates is:**

A. $Cn(H_2O)n$ B. $(CH_2O)n$
C. $Cx(H_2O)y$ D. $Cn(H_2O)n-1$

**Q.15 These are primary products of photosynthesis:**

A. Carbohydrates
B. Proteins
C. Lipids
D. Nucleic acids

**Q.16 It is not true for carbohydrates:**

A. Carbohydrates are used in synthesis of lipids
B. Carbohydrates are less soluble than fats in water
C. Carbohydrates form a component of nucleic acids
D. Carbohydrates are utilized in the synthesis of amino acids

**Q.17 It is not a carbohydrate:**

A. Starch
B. Glycogen
C. Chitin
D. Cutin

**Q.18 Most of the energy from glucose is released by breakdown of:**

A. C — O
B. C — N
C. C — H
D. C — OH

**Q.19 $C_n(H_2O)n$ is not applicable on:**

A. Glucose
B. Fructose
C. Deoxyribose
D. Ribose

**Q.20 The reducing sugars are so called because they can _____ electron/s:**

A. Donate
B. Gain
C. Share
D. Excite

**Q.21 All of the following are polymers of glucose except:**

A. Glycogen
B. Cellulose
C. Amylase
D. Amylopectin

**Q.22 Glycosidic bond cannot be found in:**

A. Glucose
B. Cellulose
C. Glycogen
D. Lactose

**Q.23 The covalent bond between two monosaccharides is called:**

A. Glycosidic linkage
B. Glucosidic linkage
C. Peptide linkage
D. Ester linkage

**Q.24 Most familiar disaccharide is:**

A. Maltose
B. Lactose
C. Sucrose
D. Cellobiose

**Q.25 An important sugar occurring only in animals is:**

A. Glucose
B. Lactose
C. Sucrose
D. Fructose

**Q.26 Hydrolysis of which of the following would yield only glucose?**

A. Sucrose
B. Maltose
C. Lactose
D. Cellulase

**Q.27 Structural polysaccharides include:**

A. Cellulose, Hemicellulose, Chitin
B. Cellulose, Starch, Chitin
C. Cellulose, Starch, Glycogen
D. Cellulose, Glycogen, Chitin

**Q.28 It is an example of polysaccharide that is soluble in hot water:**

A. Amylose
B. Glycogen
C. Cellulose
D. Amylopectin

**Q.29 Most abundant carbohydrate in nature is:**

A. Starch
B. Glycogen
C. Hemicellulose
D. Cellulose

**Q.30 Type of glycosidic linkage present in cellulose is:**

A. α 1, 4
B. β 1, 4
C. α 1, 4 and α 1, 6
D. β 1, 4 and β 1, 6

## Proteins

**Q.31 Primary structure of a protein molecule does not comprise:**

A. Number of amino acids
B. Sequence of amino acids
C. Size of protein molecule
D. Shape of protein molecule

**Q.32 All proteins in living organism always show following structural levels:**

A. Primary & secondary structure
B. Secondary & tertiary structure
C. Tertiary & quaternary structure
D. Secondary & quaternary structure

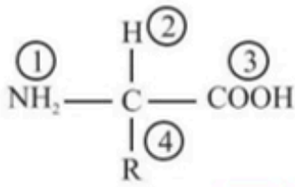
**Q.33 In quaternary structure, polypeptide chains are aggregated and held together by all of the following except:**

A. Hydrophobic interactions
B. Glycosidic linkages
C. Hydrogen bond
D. Ionic bond

**Q.34 It is an example of globular protein:**

A. Myosin
B. Fibroin
C. Fibrinogen
D. Keratin

**Q.35 An amino acid molecule has the following structure:**




**Which two of the groups combine to form a peptide link?**

A. 1 and 2
B. 1 and 3
C. 2 and 3
D. 3 and 4

**Q.36 The sequence of amino acids in a protein is determined by sequence of ____ in _____:**

A. Bases, tRNA
B. Nucleotides, Trna
C. Nucleotides, rRNA
D. Nucleotides, DNA

**Q.37 Bond that is most sensitive to rise in temperature is:**

A. Peptide bond
B. Ionic bond
C. Disulphide bond
D. Hydrogen bond

**Q.38 Number of carbon atoms in simplest amino acid are:**

A. 2
B. 3
C. 4
D. 5

**Q.39 Which amino acid is essential for formation of disulphide linkages in proteins?**

A. Glycine
B. Alanine
C. Serine
D. Cysteine

**Q.40 β-Pleated sheet is an example of:**

A. Primary structure
B. Secondary structure
C. Tertiary structure
D. Quaternary structure

## Lipids

**Q.41 Chemical compounds that are defined on base of physical properties are:**

A. Carbohydrates
B. Proteins
C. Lipids
D. Nucleic acids

**Q.42 Lipids store energy due to higher proportion of:**

A. C — C bonds
B. C — O bonds
C. C — H bonds
D. C — N bonds

**Q.43 This is an example of conjugated molecule of lipid:**

A. Acylglycerol
B. Phospholipid
C. Glycoprotein
D. Glycolipid

**Q.44 Most important components of triglycerides are:**

A. Glycerols
B. Fatty acids
C. Ketones
D. Isoprenoid

**Q.45 Functional group of fatty acid is:**

A. $-CH_3$
B. $-OH$
C. $-CHO$
D. $-COOH$

**Q.46 This is a list of some characteristics of fats and oils.**

| | FATS | OILS |
|---|---|---|
| I) | Saturated fat acids | Unsaturated fa acids |
| II) | Solid at room temperature | Liquid at room temperature |
| III) | Can be crystalized | Cannot be crystallized |
| IV) | Obtained from animals | Obtained from lants |

**Which characteristics are applicable to all fats and all oils?**

A. I & II
B. I & III
C. I, II & III
D. I, II, III & IV

**Q.47 Saturated fatty acids have C-C double bonds:**

A. 0
B. 2
C. 1
D. 3

**Q.48 All of the following nitrogenous bases are found in phospholipids except:**

A. Choline
B. Cytosine
C. Ethanolamine
D. Serine

**Q.49 Fatty acids are found in all of the following except:**

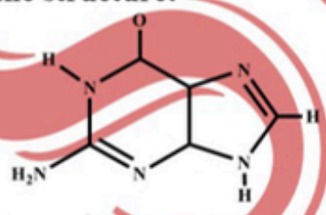
A. Acylglycerols
B. Phospholipids
C. Waxes
D. Terpenoids

**Q.50 Formation through condensation of which of the following is not associated with release of water:**

A. Amylose
B. Mrna
C. Fibrin
D. Carotenoid

## Nucleic acids, Conjugated molecules

**Q.51 Identify the structure:**



A. Guanine
B. Uracil
C. Thymine
D. Cytosine

**Q.52 Which of the following represent high energy bonds in ATP?**

A. Ribose – Adenine
B. Ribose – Phosphate
C. Phosphate – Adenine
D. Phosphate – Phosphate

**Q.53 In a typical nucleotide the nitrogenous base is attached to _____ carbon of pentose sugar:**

A. C-1
B. C-5
C. C-3
D. C-6

**Q.54 Phosphodiester bond is formed between:**

A. Two phosphate groups
B. Two phosphates & one hydroxyl group
C. One phosphate & two hydroxyl groups
D. Two phosphate & two hydroxyl groups

**Q.55 All of the following are examples of dinucleotides except:**

A. ADP
B. NAD
C. NADP
D. FAD

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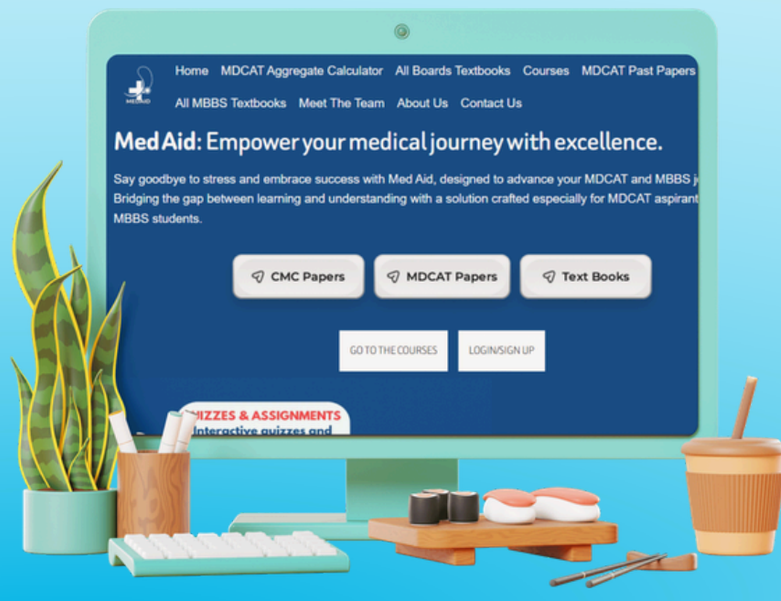


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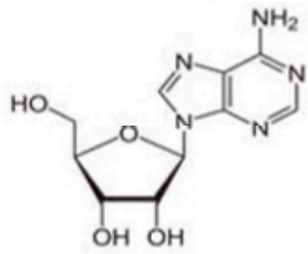
**Q.56 It is the major proportion of RNA in the cell:**

A. mRNA
B. tRNA
C. rRNA
D. rDNA

**Q.57 Messenger RNA carries the genetic information from:**

A. Nucleus to nucleolus
B. Nucleolus to ribosome
C. DNA to tRNA
D. DNA to ribosome

**Q.58 Which one is correct about the following diagram?**




A. It is a nucleotide
B. It contains pyrimidine nitrogen
C. It is used to form DNA
D. It is used to form RNA

**Q.59 Conjugated molecules are of _____ significance:**

A. Structural significance only
B. Functional significance only
C. Structural and functional significance
D. Has no structural and functional role

**Q.60 Which of the following conjugated molecule is incorrectly matched?**

A. Lipo-proteins -------- cell membrane
B. Glyco-proteins -------- cell surface antigens/ receptors
C. Glyco-lipids -------- cell wall
D. Nucleic acids --------chromosomes

## Introduction of Enzymes, Characteristics of enzymes & Mechanism of enzyme action (Models)

**Q.61 Coenzymes are mostly derived from:**

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

**Q.62 A statement that is not correct about enzymes:**

A. They increase the rate of reaction
B. They contaminate end product
C. They lower the activation energy
D. They cannot start chemical reactions

**Q.63 It is true for enzymes:**

A. Without enzymatic activities, the metabolism is very slow
B. Enzymes initiates the reaction
C. The reactants are substrate and enzyme
D. All enzyme requires co-factor

**Q.64 When apoenzyme is separated from its metal component, its activity is:**

A. Decreased
B. Lost
C. Increased
D. Remains unaffected

**Q.65 It is not true about enzymes:**

A. They increase rate of reaction without being used
B. They can change nature of end products
C. They are required in small amount
D. They lower activation energy of reactions

**Q.66 Which one of the following enzyme shows the greatest substrate specificity?**

A. Lipase
B. Nuclease
C. Pepsin
D. Sucrase

**Q.67 Which one of the following statements about enzymes is/are true?**

**1. Enzymes are proteins whose three-dimensional shape is key to their function**
**2. Enzymes speed up reaction by lowering the activation energy**
**3. Enzymes are highly specific**
**4. Enzyme activity is affected by the change in temperature and pH**

A. All except 2
B. All except 1
C. All except 3
D. All are true

**Q.68 All enzymes work best in:**

A. Aqueous medium
B. Non-aqueous medium
C. Alcoholic medium
D. Acidic medium

**Q.69 The catalytic activity of an enzyme is restricted to a small portion of the structure known as:**

A. Active site
B. Binding site
C. Allosteric site
D. Substrate site

**Q.70 Which of the following is common between Lock and Key model and Induce Fit model?**

A. Enzymes are specific in nature
B. Enzymes are rigid structures showing no change during reaction.
C. Enzymes structure is changed during reaction.
D. Enzyme acts as template.

## Factors affecting rate of enzyme action, Enzyme inhibition, Feedback inhibition & Classification of Enzymes

**Q.71 If any factor alters the chemistry and configuration of an enzyme, it will probably be:**

A. Temperature
B. pH
C. Inhibitor
D. All A, B, C

**Q.72 Optimum pH of catalase is:**

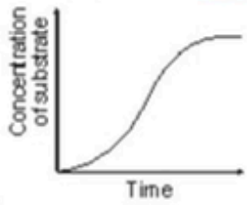
A. 5.50
B. 6.80
C. 7.60
D. 4.50

**Q.73 The rate of reaction depends directly on the amount of enzyme present at a specific time at:**

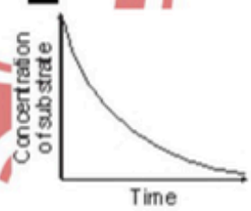
A. Limited substrate concentration
B. Unlimited enzyme concentration
C. Unlimited substrate concentration
D. Limited enzyme concentration

**Q.74 Which graph represents the change in substrate concentration during an enzymatically-controlled reaction?**

A.

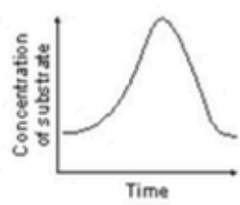



B.




C.


D




**Q.75 Which of the followings is never inhibitor?**

A. Substrate
B. ATP
C. Product
D. Antibiotic

**Q.76 All of the following are examples of enzyme inhibitors except:**

A. Cyanides
B. Antibiotics
C. Anti-metabolites
D. Antibodies

**Q.77 The activity of some enzymes is controlled by certain molecules binding to some specific area other than active site. This site is called as:**

A. Allosteric site
B. Binding site
C. Globular part
D. Catalytic site

**Q.78 Precursor activation depends upon:**

A. Final product
B. Intermediate substances
C. Initial substrate
D. All A, B, C

**Q.79 Amylase is an example of:**

A. Ligase
B. Hydrolase
C. Transfers
D. Oxidoreductases

**Q.80 The enzyme concerned with transfer of electrons is:**

A. Hydrolase
B. Transferase
C. Transaminase
D. Dehydrogenase

**Q.81 The percentage of water in bacterial cell is about:**

A. 15%
B. 17%
C. 50%
D. 70%

**Q.82 The total weight of a mammalian cell, DNA forms:**

A. 1%
B. 1.1%
C. 6%
D. 0.25%

**Q.83 The amount of heat absorbed when a liquid changes into gas is expressed as calorie per gram vaporized is called:**

A. Heat capacity
B. Specific heat
C. Heat of vaporization
D. Latent heat

**Q.84 Living organisms use water as thermo-stabilizer, due to its _____ property:**

A. Heat of vaporization
B. Heat capacity
C. Heat of sublimation
D. Heat of ionization'

**Q.85 Water molecules are bonded to each other by:**

A. Hydrogen bonding
B. Covalent bonding
C. Ionic bonding
D. Co-ordinate covalent bonding

**Q.86 In straight chain structure of glucose, all carbons contain hydroxyl group except carbon number:**

A. 1
B. 3
C. 5
D. 6

**Q.87 Ring formed by D-Ribose is:**

A. 4 cornered
B. 5 cornered
C. 6 cornered
D. 7 cornered

**Q.88 How many oxygen atoms are present in ribofuranose?**

A. 12
B. 1
C. 5
D. 6

**Q.89 _____ C in deoxyribose is devoid of 'OH' as compared to ribose sugar.**

A. 1′
B. 2′
C. 3′
D. 4′

**Q.90 Sucrose on hydrolysis yields:**

A. Two glucose molecules
B. Glucose & galactose
C. Glucose & fructose
D. Two fructose molecules

**Q.91 All of the following are the source of energy for humans except:**

A. Lactose
B. Glycogen
C. Cellulose
D. Starch

**Q.92 Which of the following is true about branching nature and solubility of amylose and amylopectin in hot water?**

| | AMYLOSE | AMYLOPECTIN |
|---|---|---|
| A | Branched, Soluble | Unbranched, Soluble |
| B | Unbranched, | Soluble Branched, Insoluble |
| C | Unbranched, | Insoluble Branched, Soluble |
| D | Branched, Insoluble | Unbranched, Soluble |

**Q.93 Common in proteins and nucleic acids is that**

A. They are hydrophobic
B. They are large polymers
C. Their structures contain sugars
D. They consist of four basic kinds of subunits

**Q.94 During formation of a dipeptide, a water molecule is released. This water takes hydrogen from:**

A. $NH_2$ group of 1st amino acid
B. COOH group of 1st amino acid
C. $NH_2$ group of 2nd amino acid
D. COOH group of 2nd amino acid

**Q.95 Size of protein molecule depends upon all except:**

A. Type of amino acids
B. Number of amino acids
C. Size of gene
D. Sequence of amino acids

**Q.96 Why do proteins have a buffering effect in cells?**

A. They are non-polar
B. They are amphoteric
C. They are a major component of cell surface membranes (plasma membranes)
D. They contain basic amino acids.

**Q.97 A sequence of amino acids may end in either an amino group ($-NH_2$) or a carboxyl group (-COOH). What is the theoretical number of chemically different dipeptides that may be assembled from 20 different amino acids?**

A. 40
B. 80
C. 160
D. 400

**Q.98 Types of atoms present in one molecule of haemoglobin:**

A. 574
B. 10000
C. 20
D. 6

**Q.99 Lipids are soluble in all of the following except:**

A. Ether
B. Water
C. Alcohol
D. Chloroform

**Q.100 In oleic acid, double bond is found between carbon numbers:**

A. 1 and 2
B. 6 and 7
C. 9 and 10
D. 17 and 18

**Q.101 Acylglycerol is neutral when it contains:**

A. 1 fatty acid
B. 3 fatty acids
C. 2 fatty acids
D. 4 fatty acids

**Q.102 Carboxylic group is found in:**

A. Fatty acids only
B. Amino acids only
C. Fatty acids & amino acids
D. Fatty acids, amino acids & nucleic acids

**Q.103 Lipids carrying polarity are:**

A. Acylglycerols
B. Phospholipids
C. Waxes
D. Neutral lipids

**Q.104 In a typical nucleotide, phosphoric acid is attached to pentose sugar at carbon number:**

A. 1
B. 2
C. 3
D. 5

**Q.105 Nucleic acids are polymers of:**

A. Pentoses
B. Hexoses
C. Nucleosides
D. Nucleotides

**Q.106 Number of nitrogen atoms present in adenine:**

A. 5
B. 2
C. 7
D. 6

**Q.107 A short length of DNA has 80 thymine and 60 guanine bases, the total number of nucleotides in that sample will be:**

A. 40
B. 180
C. 280
D. 360

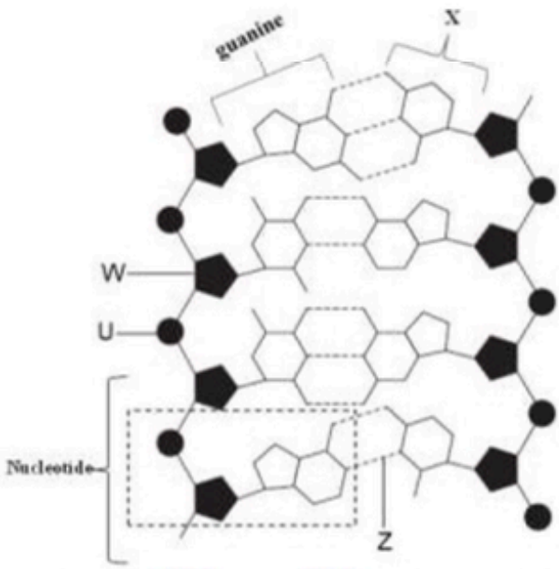
**Q.108 If there are 2 thymine bases in one turn of DNA helix, what will be the amount of cytosine in that turn?**

A. 2
B. 8
C. 16
D. Cannot be estimated

**Q.109 Phosphodiester linkage is represented by a pair of:**

A. O—P—O
B. O—C—O
C. C—P—C
D. P—O—C

**Q.110 Find out the correct identifications of "X", "W", "U", and "Z":**




A. X: Cytosine, W: Pentose sugar, U: Phosphate group, Z: Hydrogen bond
B. X: Cytidine, W: Pentose sugar, U: Phosphate group, Z: Hydrogen bond
C. X: Cytosine, W: Phosphate group, U: Pentose sugar, Z: Hydrogen bond
D. X: Cytidine, W: Hydrogen bond, U: Phosphate group, Z: Pentose sugar

**Q.111 Which of the following conjugated molecule is a major constituent of cell membrane?**

A. lipo-proteins
B. glyco-proteins
C. glyco-lipids
D. nucleic acids

**Q.112 These are the most important group of proteins which are biologically active:**

A. Ribozymes
B. Enzymes
C. Hormones
D. Coenzymes

**Q.113 Enzymes which are involved in aerobic respiration in plant cell are found in:**

A. Chloroplast
B. Mitochondria
C. Cytosol
D. Ribosome

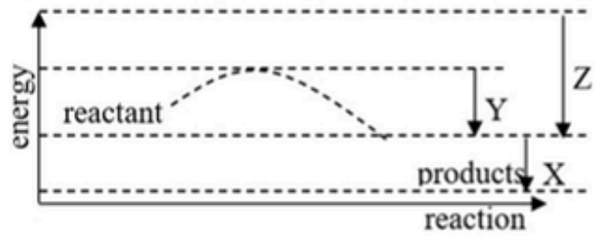
**Q.114 Haeme is an example of:**

A. Cofactor
B. Activator
C. Coenzyme
D. Prosthetic group

**Q.115 Pick the wrong statement regarding co-factor:**

A. Essentially required for enzyme functioning if present
B. Acts as enzyme between active site and substrate
C. May provide chemical energy for driving chemical reaction
D. Acts as bridge between enzyme and substrate

**Q.116 The diagram illustrates energy changes in an enzyme-controlled reaction:**




**Which of the following represents the lowering of the activation energy?**

A. Y
B. Z + X
C. Z – Y
D. X + Y

**Q.117 The charge and shape of the active site is formed by:**

A. Cofactor
B. Allosteric site
C. Amino acids
D. Globular shape

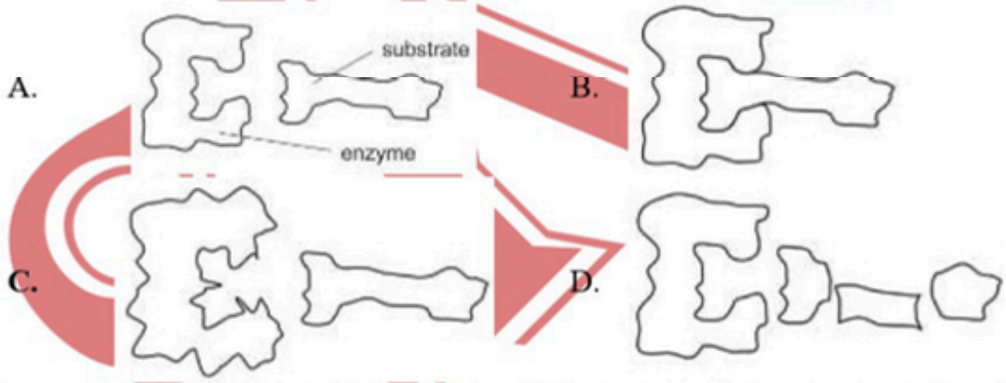
**Q.118 This is the core of Induce Fit Model which distinguishes it from Lock and Key model:**

A. Catalytic nature of enzyme
B. Specificity of enzyme
C. Change in enzyme
D. Change in substrate

**Q.119 In a normal laboratory reaction, substance A is being converted to substance B. What change will occur in reaction, if we add respective enzyme in it:**

A. A will form C
B. No activation energy will be needed now for reaction
C. Quality of B will be increased
D. Production of B will be increased

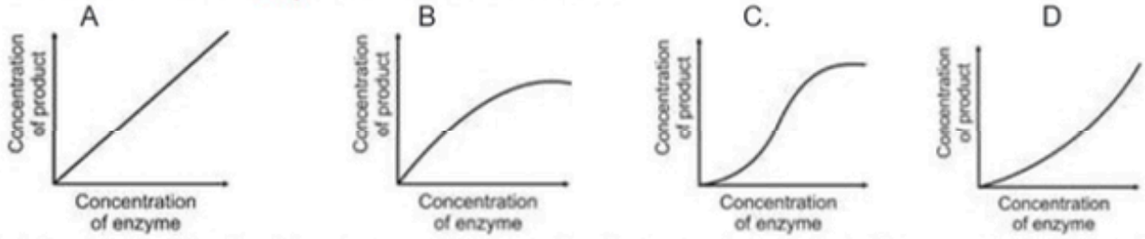
**Q.120 The diagrams represent an enzyme molecule and its substrate. Which one shows these molecules after they are heated to 100 °C?**




**Q.121 An enzyme that requires highly basic pH for its proper functioning is found in:**

A. Stomach
B. Duodenum
C. Liver
D. Plasma

**Q.122 Which graph shows the effect of increasing enzyme concentration on product formation when there is an excess of substrate**




**Q.123 After a certain limiting concentration of substrate, increasing the concentration of enzyme two times, rate of reaction will:**

A. Increase four times
B. Increase three times
C. Increase two times
D. Remain constant

**Q.124 The effect of which one of the following can be reversed by increasing substrate concentration:**

A. Un-competitive inhibitor
B. Competitive reversible inhibitor
C. Irreversible inhibitor
D. Non-competitive reversible inhibitor

**Q.125 Malonic acid is an example of reversible inhibitor; it inhibits succinic acid dehydrogenase by:**

A. Forming weak linkage with active site
B. Forming weak linkage with allosteric site
C. Forming covalent bond with active site
D. Forming covalent bond with allosteric site

**Q.126 Any agent which reduces/ slows down or stops the rate of reaction of enzymes is termed as:**

A. Inhibitor
B. Repressor
C. Enhancer
D. Activator

**Q.127 In an enzyme-controlled chain reaction, if concentration of initial substrate is increased then it will cause:**

A. Feedback inhibition
B. Precursor activation
C. End product inhibition
D. Enzyme to enzyme association

**Q.128 The enzymes bringing about hydrolysis of esters and peptides are:**

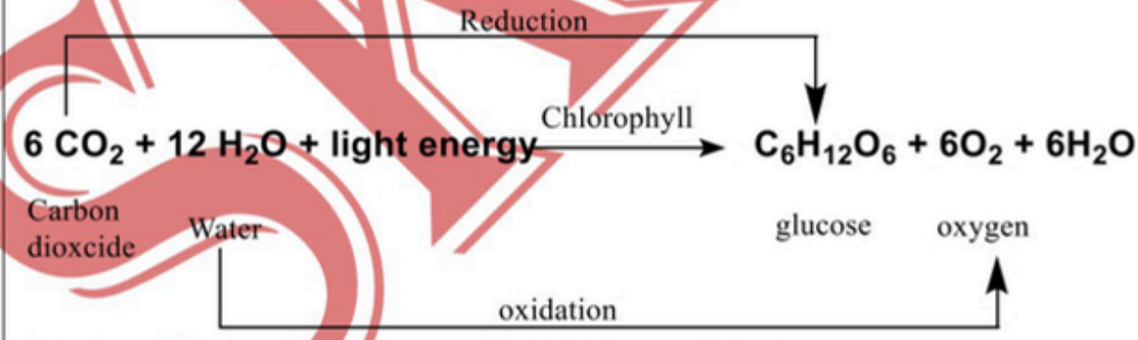
A. Lyases
B. Hydrolases
C. Transferases
D. Oxidoreductases

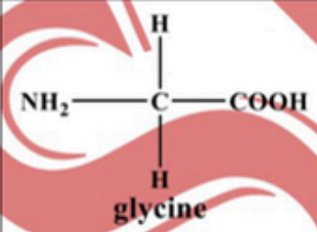
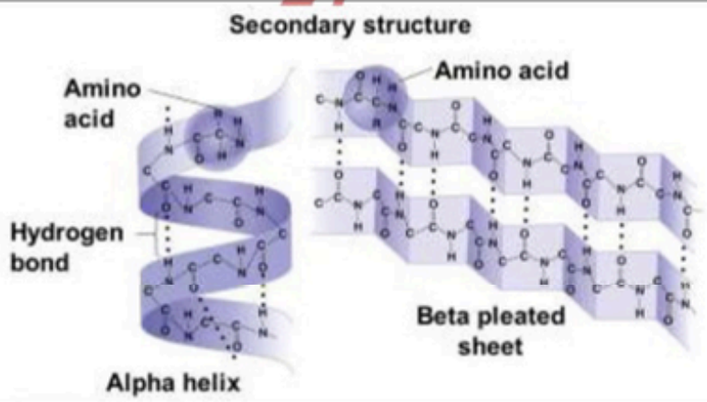
**Q.129 Which one in not an example for hydrolase?**

A. Amylase
B. Sucrase
C. Dehydrogenase
D. Protease

**Q.130 The enzymes catalyzing re-arrangement of atomic grouping without altering molecular weight or number of atoms is:**

A. Ligases
B. Isomerases
C. Hydrolases
D. Oxidoreductase

| ANSWERS AND EXPLANTION | | |
|---|---|---|
| **Q.1** | **C** | Carbohydrate is 3 % of the total Bacterial cell. |
| **Q.2** | **B** | Protein is 18% of the total mammalian cell. |
| **Q.3** | **A** | Heat capacity is the amount of energy to increase the temperature of that substance by $1^0C$. |
| **Q.4** | **A** | Sucrose + $H_2O$ → Glucose + Fructose |
| **Q.5** | **A** | Larger organic macromolecules are formed through condensation reactions. Glucose is formed through photosynthesis. |
| **Q.6** | **D** | Two amino acids are connected through peptide bond. |
| **Q.7** | **D** | Mostly living organism use glucose as major energy source. |
| **Q.8** | **A** | To increase 1C temperature of 1 gram of water we need 1 cal. |
| **Q.9** | **A** | 70-90% of body weight consists of water. Below 10% water in protoplasm, the survival of cell become impossible. |
| **Q.10** | **C** | Water has ability to absorb a lot of heat with a little change in its own temperature. |
| **Q.11** | **B** | • Biuret test is to detect proteins.<br>• Spot test is for fats.<br>• Iodine test is for polysaccharides. |
| **Q.12** | **C** | C, H and O are essential elements found in all carbohydrates while N is non-essential element. |
| **Q.13** | **D** | They have same ratio as in $H_2O$ (2:1). |
| **Q.14** | **C** | • $C_n(H_2O)n$ and $(CH_2O)n$ are general formulae of monosaccharides.<br>• $C_n(H_2O)_{n-1}$ is the general formula of disaccharides. |
| **Q.15** | **A** |  <br>All other organic compounds are synthesized from carbohydrates. |
| **Q.16** | **B** | Fats are not soluble in water. They are hydrophobic compounds. |
| **Q.17** | **D** | Cutin is one of the two waxy polymers that are the main components of the plant cuticle, which covers all aerial surfaces of plants. |
| **Q.18** | **C** | C — H linkage is principal source of energy. |
| **Q.19** | **C** | Formula of deoxyribose is $C_5H_{10}O_4$. |
| **Q.20** | **A** | Reducing sugars act as reducing agents and release electrons from aldehyde or ketone group. All other biological organic compounds are derived from carbohydrates so have elements of carbohydrates (C, H, O) are common in all. |
| **Q.21** | **C** | Amylase is enzyme and polymer of amino acids. |
| **Q.22** | **A** | Monosaccharides being single sugars do not have glycosidic bond. |
| **Q.23** | **A** | • Glycosidic linkage is found between sugar units.<br>• Peptide bond in proteins between amino acids. |

| | | |
|---|---|---|
| | | • Ester linkage in lipids and nucleic acids. |
| **Q.24** | **C** | Sucrose is most common disaccharide in nature. |
| **Q.25** | **B** | Lactose is a milk sugar. |
| **Q.26** | **B** | • Lactose → Galactose + Glucose<br>• Sucrose → Glucose + Fructose<br>• Cellulase → Amino Acids |
| **Q.27** | **A** | Starch and glycogen are storage polysaccharides. |
| **Q.28** | **A** | All others are completely insoluble in water. |
| **Q.29** | **D** | • Cellulose is found in cell wall of plants, algae and fungi like prortists.<br>• Glycogen is also called as animal starch because it is stored carbohydrates in animal |
| **Q.30** | **B** | Cellulose is linear polymer of β-glucose and is unbranched polysaccharide. |
| **Q.31** | **D** | Primary structure is associated with number and sequence of amino acids. Size of protein molecule also depends upon number of amino acids. |
| **Q.32** | **A** | Primary and secondary structures are found in all proteins while tertiary and quaternary structures are found in globular proteins only. |
| **Q.33** | **B** | Glycosidic linkages are associated with sugar units. |
| **Q.34** | **C** | • Fibroin is silk protein.<br>• Fibrinogen is globular while fibrin is fibrous. |
| **Q.35** | **B** | Peptide bond is formed between amino group of one amino acid and carboxyl group of adjacent amino acid. |
| **Q.36** | **D** | DNA determines the primary structure of proteins. |
| **Q.37** | **D** | Ionic bond is most sensitive to pH change. |
| **Q.38** | **A** |  |
| **Q.39** | **D** | Cysteine is sulpher containing amino acid. |
| **Q.40** | **B** |  |
| **Q.41** | **C** | Lipids are defined on base of solubility. |
| **Q.42** | **C** | C-H bond is potential source of energy and lipids have their double number as compared to carbohydrates. |
| **Q.43** | **D** | Acylglycerols and phospholipids are simple lipids while glycolipids are derivatives. |

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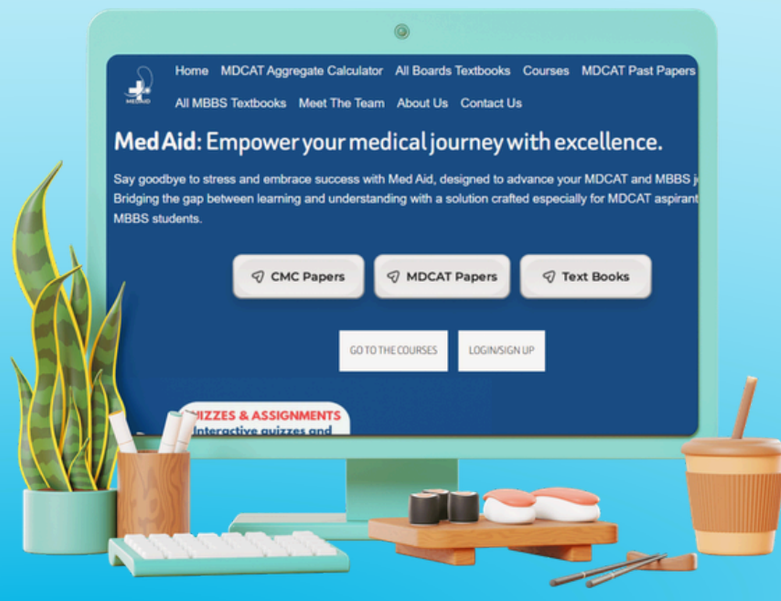


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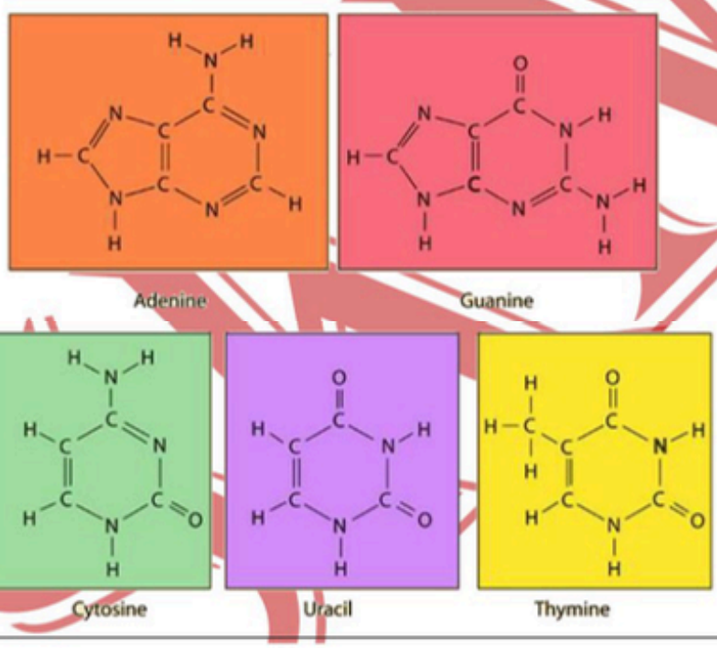
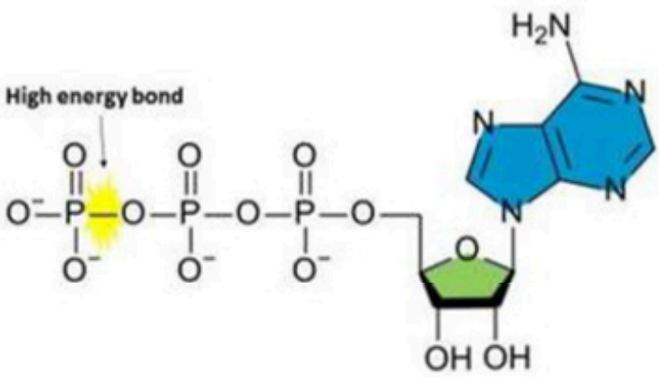
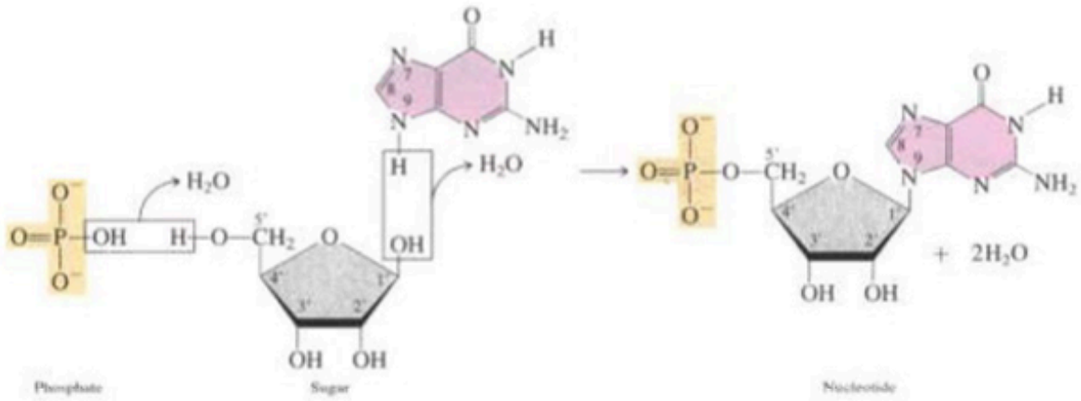
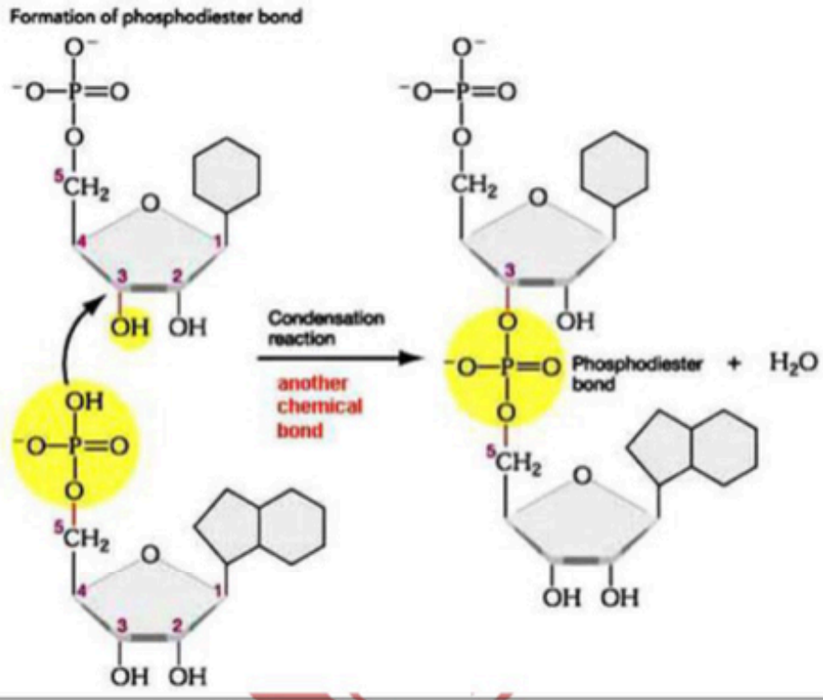
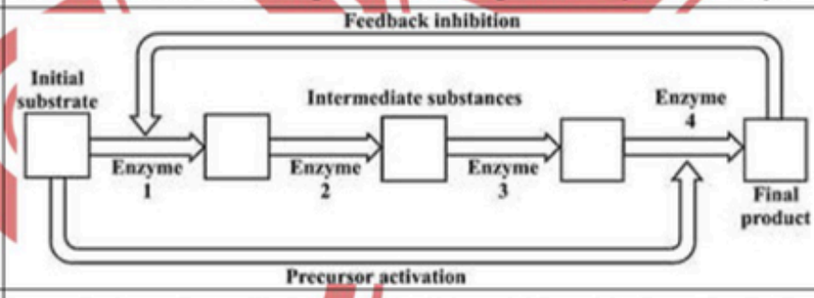
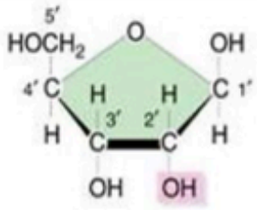
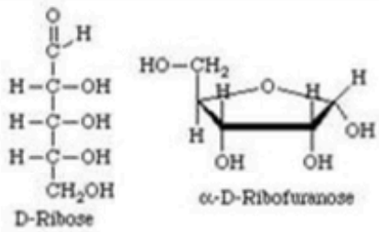
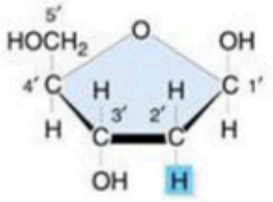
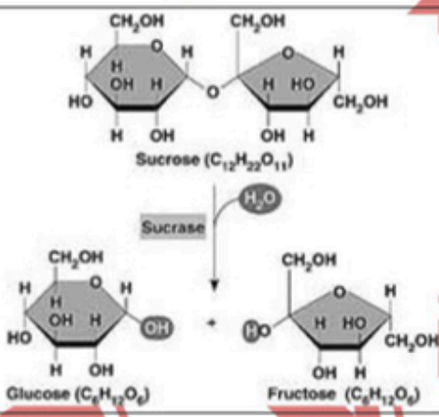
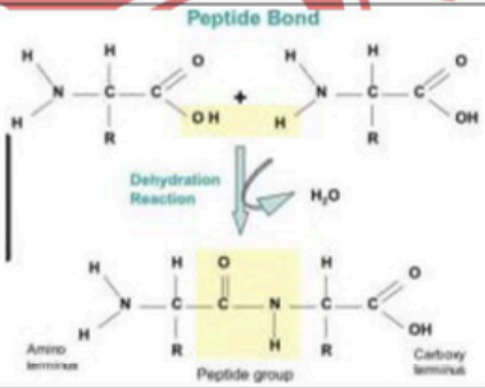
| | | |
|---|---|---|
| **Q.44** | **B** | Properties of triglycerides depends upon type of fatty acid present. |
| **Q.45** | **D** | General formula of fatty acid is R-COOH where R is hydrocarbon tails and COOH is carboxylic acid. |
| **Q.46** | **B** | |

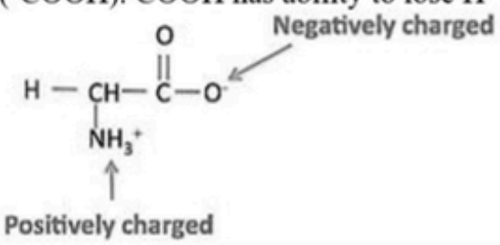
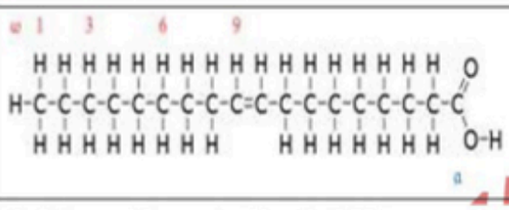
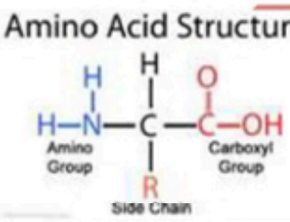
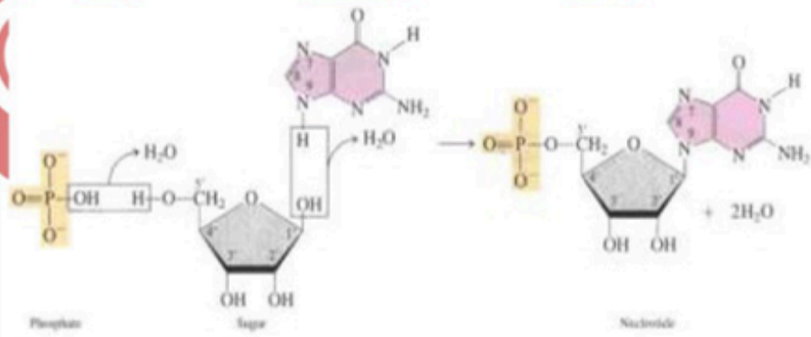
| SATURATED FATTY ACID | UNSATURATED FATTY ACID |
|---|---|
| No double bonds between carbon atoms | Upto six double bonds |
| Straight chain | Ringed /Branched |
| Solid at room temperature | Liquid at room tem erature |
| Fats | Oils |
| Animals | Plants |
| | More useful for living things. |

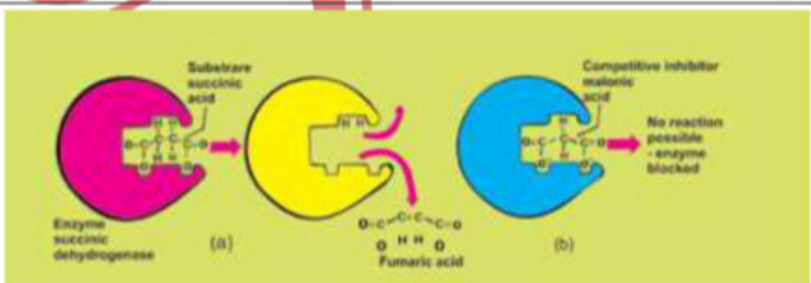
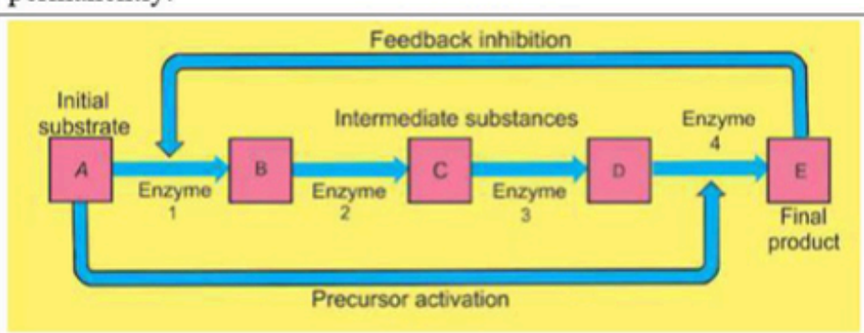
| | | |
|---|---|---|
| **Q.47** | **A** | • Fatty acids having no double bond are called ***saturated fatty acids***.<br>• Fatty acids having up to 6 double bonds are called ***unsaturated fatty acids***. |
| **Q.48** | **B** | Cytosine is found in DNA and RNA. |
| **Q.49** | **D** | Terpenoids contain isoprenoid units instead of fatty acids. |
| **Q.50** | **D** | Isoprenoid units are condensed to form carotenoids. This condensation does not involve release of water. |
| **Q.51** | **A** |  |
| **Q.52** | **D** |  |

| | | |
|---|---|---|
| **Q.53** | **A** |  |
| **Q.54** | **C** |   |
| **Q.55** | **A** | ADP is a mononucleotide. |
| **Q.56** | **C** | rRNA constitutes about 80% of total RNA found in any cell. |
| **Q.57** | **D** | mRNA is formed from DNA through transcription and translated at ribosomes. |
| **Q.58** | **D** | • It is a nucleoside as it does not contain phosphate group.<br>• It is used to form RNA as it contains ribose sugar. |
| **Q.59** | **C** | Conjugated molecules are structural components of plasma membranes (structural role), while also play role in regulation of gene expression (functional role) |
| **Q.60** | **C** | • Cell wall composition:<br>• Plants ------- cellulose (carbohydrate)<br>• Fungi -------- chitin (carbohydrate)<br>• Bacteria ----- peptidoglycan |
| **Q.61** | **D** | As coenzymes are usually involved in redox reaction for enzymes and this action is more suitable for vitamins rather than carbohydrates and proteins. Hence, all coenzymes are derivatives of vitamins. For example, $NAD^+$ is derived from niacin i.e. vitamin $B_3$. |
| **Q.62** | **B** | Nature of end product never changes due to enzyme. Enzyme can just speed up the reaction and the product will be of same quality as with or without enzyme. |
| **Q.63** | **A** | Enzymes act as organic catalyst and speed up already occurring reactions. |
| **Q.64** | **B** | Holoenzyme (Activated Enzyme) – Co-Factor = Apoenzyme (Inactive Enzyme) |

| | | |
|---|---|---|
| **Q.65** | **B** | Enzymes cannot change nature of end product. |
| **Q.66** | **D** | • Lipase acts on different kinds of lipids.<br>• Nuclease acts on nucleic acids whether DNA or RNA.<br>• Pepsin acts on different kinds of proteins.<br>• Sucrase acts only on sucrose. |
| **Q.67** | **D** | These are characteristics of enzymes. |
| **Q.68** | **A** | Aqueous medium is required to help enzyme and substrate in proper orientation. |
| **Q.69** | **A** | The active site of an enzyme is a three-dimensional cavity bearing a specific charge by which the enzyme reacts with its substrate |
| **Q.70** | **A** | Both the above models of enzyme actions recognize the fact that enzymes are highly specific in nature due to specific amino acid sequence. Due to this every enzyme can catalyze a specific reaction only with a specific substrate(s). |
| **Q.71** | **D** | Enzymes are globular proteins and sensitive to certain chemicals and changes in temperature and pH. |
| **Q.72** | **C** | Catalase is found in peroxisomes and involved in breakdown of $H_2O_2$. |
| **Q.73** | **C** | At unlimited substrate concentration, rate of reaction depends upon enzyme. |
| **Q.74** | **B** | Increase in amount of a substrate when there is a limited number of enzymes cause decrease in rate of reaction with time due to saturation of active sites. |
| **Q.75** | **A** | Reaction product and ATP are involved in feedback inhibition.<br>Antibiotics act as inhibitors of bacterial enzymes. |
| **Q.76** | **D** | Antibodies do not have ability to block enzymes. |
| **Q.77** | **A** | Allosteric site is another regulatory site in certain enzymes, other than active site. Inhibitor or cofactor after binding at this site regulate enzyme activity. |
| **Q.78** | **C** |  |
| **Q.79** | **B** | Amylases are starch-degrading enzymes that catalyze the hydrolysis of internal α-1-4 glycosidic bonds in polysaccharides to form simpler sugar e.g., maltose and dextrins. |
| **Q.80** | **D** | A dehydrogenase is an enzyme belonging to the sub-group of oxidoreductases that oxidizes a substrate by reducing an electron acceptor, usually $NAD^+$/$NADP^+$ or a flavin coenzyme such as FAD or FMN. |
| **Q.81** | **D** | Bacterial cell comprises 70% water of total cell weight |
| **Q.82** | **D** | DNA is 0.25% of the total mammalian cell. |
| **Q.83** | **C** | Heat of vaporization is expressed as calories absorbed per gram vaporized. The specific heat of vaporization of water is 574 Kcal/kg. |
| **Q.84** | **B** | Water absorbs large amount of heat without changing its temperature. |
| **Q.85** | **A** | Due to high electronegativity difference between oxygen and hydrogen in water molecules, these can form strong intermolecular interactions. |
| **Q.86** | **A** | In carbohydrates, all carbons contain hydroxyl group except carbon of aldehyde or ketone group. |

| | | |
|---|---|---|
| **Q.87** | **B** |  |
| **Q.88** | **C** |   |
| **Q.89** | **B** |  |
| **Q.90** | **C** |   |
| **Q.91** | **C** | Humans cannot digest cellulose so cannot be used by our body. |
| **Q.92** | **B** | • Amylose is unbranched and soluble in hot water.<br>• Amylopectin is branched and insoluble. |
| **Q.93** | **B** | Proteins are large polymers of amino acids while nucleic acids are polymers of nucleotides. |
| **Q.94** | **C** |   |
| **Q.95** | **D** | Amino acids can be small or large so size of proteins depends both upon number and kind of amino acids. |
| **Q.96** | **B** | A sequence of amino acids may end in either an amino group ($-NH_2$) or a carboxyl group |

| | | |
|---|---|---|
| | | (-COOH). COOH has ability to lose $H^+$ and $NH_2$ has ability to gain $H^+$.<br>  |
| **Q.97** | **D** | $(20)^2 = 20 \times 20 = 400$. As 20 different types of amino acids will form dipeptides. |
| **Q.98** | **D** | Hemoglobin contains C, H, O, N, S, Fe |
| **Q.99** | **B** | Lipids are hydrophobic compounds so insoluble in water. |
| **Q.100** | **C** |  |
| **Q.101** | **B** | 3 fatty acids neutralize 3 OH groups in glycerol. |
| **Q.102** | **C** | • Fatty acid: R-COOH<br>• Amino acid:<br>  |
| **Q.103** | **B** | Head in phospholipid molecule is polar due to presence of phosphate group. |
| **Q.104** | **D** |  |
| **Q.105** | **D** | Nucleotide is basic unit of nucleic acid which contains pentose sugar, nitrogenous base and phosphoric acid. |
| **Q.106** | **A** | Chemical formula of adenine is $C_5H_5N_5$. |
| **Q.107** | **C** | If T=80 & G=60 then<br>A=80 & C=60<br>Total nucleotides will be:<br>T+G+A+C = 80+60+80+60=280 |
| **Q.108** | **B** | One turn of DNA contains 20 bases. If thymine is 2 then adenine will also be 2. Out of remaining 16, 8 will be guanine and 8 cytosine. |
| **Q.109** | **D** | Phosphodiester linkage is C-O-P-O-C that is also written as a pair of P-O-C link. |
| **Q.110** | **A** | • X is single ringed base. |

<table>
<tr><td></td><td></td><td>• W is pentose sugar.<br>• U is phosphate group.<br>• Z is hydrogen bond between bases.</td></tr>
<tr><td>Q.111</td><td>A</td><td>Major constituents of biological membrane are lipo-protein</td></tr>
<tr><td>Q.112</td><td>B</td><td>Ribozymes are enzymes that are made of RNA. Coenzyme are other than protein, while nature of hormones can be steroid so only one which is protein and biologically active are enzymes.</td></tr>
<tr><td>Q.113</td><td>B</td><td>Aerobic respiration in eukaryotic cells is associated with mitochondria.</td></tr>
<tr><td>Q.114</td><td>D</td><td>Haeme is permanently attached with protein part of hemoglobin.</td></tr>
<tr><td>Q.115</td><td>B</td><td>Cofactor acts as bridge between enzyme and substrate.</td></tr>
<tr><td>Q.116</td><td>C</td><td>• Peak of Straight curve = activation energy needed in the absence of enzymes.<br>• Peak of dotted line= activation energy needed in the presence of enzymes.<br>• Z-Y is the energy lowered by enzymes.</td></tr>
<tr><td>Q.117</td><td>C</td><td>Active site is made of 3-12 amino acids which determine its charge, shape and specificity.</td></tr>
<tr><td>Q.118</td><td>C</td><td><table><tr><th>Lock & Key Model</th><th>Induce Fit Model</th></tr><tr><td>• Enzyme is rigid Structure.</td><td>• Enzyme is flexible structure</td></tr><tr><td>• Enzyme does not show change during reaction.</td><td>• Enzyme shows change during reaction.</td></tr></table></td></tr>
<tr><td>Q.119</td><td>D</td><td>More enzyme will provide more active sites for reaction.</td></tr>
<tr><td>Q.120</td><td>C</td><td>Very high temperature cause denaturation of enzyme by destroying its globular structure.</td></tr>
<tr><td>Q.121</td><td>C</td><td>Arginase has optimum pH value of 9.70 and is involved in urea cycle in liver.</td></tr>
<tr><td>Q.122</td><td>A</td><td>Graph line will be straight, as increasing enzyme concentration will increase product formation in the presence of unlimited substrate concentration.</td></tr>
<tr><td>Q.123</td><td>D</td><td>After reaching limiting concentration of substrates, increasing the enzymes would not increase rate of reaction as substrates are not available for enzymes to act.</td></tr>
<tr><td>Q.124</td><td>B</td><td>There is competition between genuine substrate and inhibitor. Enzyme will bind with one that is more in concentration.</td></tr>
<tr><td>Q.125</td><td>A</td><td> 
</td></tr>
<tr><td>Q.126</td><td>A</td><td>Enzyme inhibitors are chemical substances which block enzyme activity temporarily or permanently.</td></tr>
<tr><td>Q.127</td><td>B</td><td> 
</td></tr>
</table>

| | | |
|---|---|---|
| **Q.128** | **B** | Enzymes that hydrolyze esters are called esterases, and the enzymes that bring about hydrolysis of peptides are peptidases/proteases. Both esterases and peptidases/proteases belongs to 'hydrolases'. |
| **Q.129** | **C** | Amylase, sucrase and proteases are examples of hydrolases while dehydrogenases are a group of enzymes that mediate biochemical reactions by removing $H_2$ atom instead of $O_2$ in its redox reactions. |
| **Q.130** | **B** | Isomerases are a general class of enzymes that convert a molecule from one isomer to another. They facilitate intra-molecular rearrangements in which bonds are broken and formed. |

# BIOENERGETICS

## Photosynthesis, Role of light and photosynthetic pigments & Role of water and $CO_2$

**Q.1 Net equation of photosynthesis is exactly opposite to the equation of:**
A. Lactic acid fermentation
B. Alcoholic fermentation
C. Aerobic respiration
D. Anaerobic respiration

**Q.2 It is by product of photosynthesis:**
A. $CO_2$
B. $H_2O$
C. $O_2$
D. $C_6H_{12}O_6$

**Q.3 Absorption spectrum of chlorophylls indicates that maximum absorption is at:**
A. 380 nm
B. 430 nm
C. 500 nm
D. 620 nm

**Q.4 Which of the following colour is absorbed by carotenoids and reflected by chlorophylls?**
A. Blue
B. Green
C. Violet
D. Red

**Q.5 It is true about peaks and valley of action spectrum:**
A. Peaks – Broader, Valley – Broader
B. Peaks – Narrow, Valley – Narrow
C. Peaks – Narrow, Valley – Broader
D. Peaks – Broader, Valley – Narrow

**Q.6 Light can work in chloroplast if it is:**
A. Transmitted
B. Reflected
C. Absorbed
D. Refracted

**Q.7 Oxygen released during photosynthesis comes from:**
A. $CO_2$
B. $H_2O$
C. $C_3H_6O_3$
D. $C_6H_{12}O_6$

**Q.8 In water, photosynthetic organisms usually get _____ as their carbon source.**
A. Dissolved $CO_2$
B. Bicarbonates
C. Dissolved carbonates
D. All of these

**Q.9 The entry of $CO_2$ in leaves mainly depends upon:**
A. Area covered by air spaces
B. Thickness of leaves
C. Opening of stomata
D. Respiratory activity of plants

**Q.10 Air contains _____% of $CO_2$.**
A. 0.01 ---- 0.02
B. 0.02 ---- 0.03
C. 0.03 ---- 0.04
D. 0.04 ---- 0.05

## Role of light and photosynthetic pigments, Light dependent reactions (Production of ATP via ETC/Chemiosmosis)

**Q.11 _____ are mostly red to orange pigments.**
A. Chlorophylls
B. Carotenoids
C. Carotenes
D. Xanthophylls

**Q.12 All of the following are characteristics of head of chlorophyll except:**
A. Light absorbing
B. Hydrophobic
C. Porphyrin ring
D. Tetrapyrrole ring

**Q.13 Terminal group in chlorophyll b that is different from a is:**
A. Methyl group
B. Carbonyl group
C. Carboxyl group
D. Ketone group

**Q.14 Eukaryotic photosynthetic organisms have chlorophyll:**
A. a & b
B. a & c
C. b & c
D. a, b, c & d

**Q.15 Pyrrole rings of chlorophylls are composed of:**
A. Carbon & hydrogen
B. Carbon & nitrogen
C. Carbon & oxygen
D. Hydrogen & oxygen

**Q.16 Light gathering part of a photosystem is:**
A. Only chlorophyll a
B. Electron transport system
C. Antenna complex
D. Only carotenoids

**Q.17 The main difference between photosystem I and photosystem II lies in their:**
A. Antenna complex
B. Reaction center

C. Chlorophyll a
D. Chlorophyll b

**Q.18 It has main role in the conversion of light energy into chemical energy:**
A. Cytoplasm
B. Stroma
C. Antenna complex
D. Reaction center

**Q.19 Photosynthetic pigments are organized to form:**
A. Thylakoids
B. Grana
C. Photosystem
D. Reaction center

**Q.20 Which of the following is not involved in cyclic photophosphorylation?**
A. Primary electron acceptor
B. Cytochrome complex
C. Photosystem I
D. Photosystem II

**Q.21 In cyclic photophosphorylation, the flow of electrons will be:**
A. PEA > Cytochrome complex > Plastocyanin
B. PEA > Ferridoxin > Plastocyanin
C. PEA > Cytochrome complex > Ferridoxin
D. PEA > Ferridoxin > Cytochrome complex > Plastocyanin

**Q.22 It is the product of cyclic photophosphorylation:**
A. ATP
B. NADPH
C. $O_2$
D. All A, B, C

**Q.23 Which of the following plays direct role in generation of ATP by chemiosmosis?**
A. Antenna complex
B. Reaction center
C. Electron transport chain
D. Primary electron acceptors

**Q.24 It is the final acceptor of electrons in light dependent phase of photosynthesis:**
A. Chlorophyll
B. $NADP^+$
C. Glucose
D. Ferredoxin

## Light independent reaction

**Q.25 The dark reactions of photosynthesis take place in:**
A. Cytosol of cytoplasm
B. Mitochondrial matrix
C. Thylakoid membranes
D. Stroma of chloroplast

**Q.26 Phase of Calvin cycle that is dependent on rubisco:**
A. $CO_2$ fixation
B. Regeneration of RuBP
C. Reduction
D. Assimilation

**Q.27 The NADPH and ATP from the light-dependent reactions are used to:**
A. Regenerate RuBP
B. Fix $CO_2$
C. Convert PGAL to RuP
D. Convert PGA to PGAL

**Q.28 Which is most closely associated with the Calvin cycle?**
A. ATP production
B. Sugar production
C. Oxygen production
D. Carbon dioxide production

**Q.29 In which of the following, NADPH is converted into $NADP^+$:**
A. Light dependent phase
B. Light independent phase
C. Aerobic respiration
D. Anaerobic respiration

**Q.30 NADP and $CO_2$ both are reduced during photosynthesis by hydrogen. Their reduction occurs respectively in:**
A. Light reaction and dark reaction
B. Light reactions only
C. Dark reaction and light reaction
D. Dark reactions only

## Cellular respiration (Aerobic and Anaerobic Reactions)

**Q.31 Mitochondria are involved in all of the following except:**
A. Fermentation
B. Krebs cycle
C. Fatty acid oxidation
D. Pyruvic acid oxidation

**Q.32 During aerobic respiration, glucose is oxidized to:**
A. Pyruvate & $CO_2$
B. Lactate & $CO_2$
C. Ethyl alcohol & $CO_2$
D. $H_2O$, $CO_2$ & energy

**Q.33 It is the process by which energy is made available to cells in a step-by-step breakdown of C−chain molecules in the cells:**
A. External respiration
B. Internal respiration
C. Tissue respiration
D. Cellular respiration

**Q.34 It is the universal process by which organism's breakdown complex compounds containing carbon in a way that allows cells to harvest a maximum of usable energy:**

A. Metabolism
B. Digestion
C. Respiration
D. Photosynthesis

**Q.35 Majority of the cells depend ultimately for their supply of free energy on oxidation reactions such as:**

A. Fermentation
B. Respiration
C. Photosynthesis
D. Chemosynthesis

**Q.36 Pyruvate produced during glycolysis proceeds further in presence of oxygen through:**

A. Lactic acid fermentation
B. Aerobic respiration
C. Alcoholic fermentation
D. All A, B, C

**Q.37 Which of these processes will not occur in the absence of $O_2$?**

A. Krebs cycle
B. Oxidative phosphorylation
C. Pyruvic acid oxidation
D. All of these

**Q.38 Net production of ATP molecules in a prokaryotic cell when a glucose molecule is completely oxidized is:**

A. 34 ATP
B. 36 ATP
C. 38 ATP
D. 40 ATP

**Q.39 Chemical equation of photosynthesis is almost exactly opposite to the overall equation of:**

A. Respiration
B. Lactic acid fermentation
C. Alcoholic fermentation
D. Aerobic respiration

**Q.40 Which of the following pathways outlines the order of events during aerobic cellular respiration?**

**First ⟶ Last**

A. Glucose → triose phosphate → pyruvate → Krebs cycle → $CO_2$ + H2O + ATP
B. Glucose → triose phosphate → pyruvate → Krebs cycle → $CO_2$ + $H_2O$ + ADP + Pi
C. Glucose → hexose phosphate → pyruvate → Krebs cycle → $CO_2$ + $H_2O$ + ADP + Pi
D. Glucose → hexose phosphate → pyruvate → Krebs cycle → ethanol + $CO_2$ + ATP

## Glycolysis, Pyruvic acid oxidation, Kerbs cycle

**Q.41 Step of cellular respiration that does not depend upon availability of oxygen is:**

A. Glycolysis
B. Pyruvic acid oxidation
C. Krebs cycle
D. Oxidative phosphorylation

**Q.42 Glycolysis starts with:**

A. Splitting of glucose molecule
B. Phosphorylation of glucose
C. Hydrolysis of glucose
D. Reduction of glucose

**Q.43 It is true about preparatory phase of glycolysis:**

A. ATP are consumed
B. ATP are produced
C. NADH are consumed
D. NAD+ are produced

**Q.44 Which of the following correctly represents the end product (net) of glycolysis other than pyruvate?**

| | ATP | NADH | $H_2O$ |
|---|---|---|---|
| A. | 4 | 4 | 4 |
| B. | 2 | 2 | 2 |
| C. | 4 | 2 | 4 |
| D. | 2 | 4 | 2 |

**Q.45 Which of the following directly enters in Krebs cycle?**

A. Glucose
B. Pyruvate
C. Acetate
D. Acetyl CoA

**Q.46 During Krebs cycle, $FADH_2$ is formed during conversion of:**

A. Iso-citrate into α-ketoglutarate
B. α-ketoglutarate into succinate
C. Succinate into fumarate
D. Fumarate into malate

**Q.47 How many molecules of NADH are formed when one glucose molecules pass through Krebs cycle?**

A. 3
B. 4
C. 6
D. 8

**Q.48 Number of ATP generated by one Kreb's cycle at substrate level is:**

A. 1 ATP
B. 3 ATP
C. 2 ATP
D. 4 ATP

**Q.49 In which step of Krebs cycle decarboxylation does occur?**

A. Citrate to isocitrate formation
B. Fumarate to malate formation
C. α - ketoglutraate to isocitrate formation
D. Isocitrate to a-ketoglutarate formation

**Q.50 α-ketoglutarate is _____ carbon compound.**

A. 3
B. 4
C. 5
D. 6

## Respiratory chain and Oxidative phosphorylation

**Q.51 In aerobic respiration, $H_2O$ as a final product is generated during:**

A. Lactic acid fermentation
B. Pyruvic acid oxidation
C. Krebs cycle
D. Oxidative phosphorylation

**Q.52 In respiratory chain, NADH is oxidized by:**

A. $FADH_2$
B. ATP
C. Co-enzyme Q
D. $O_2$

**Q.53 During oxidative phosphorylation, $H^+$ are pumped across:**

A. Outer mitochondrial membrane
B. Inner mitochondrial membrane
C. Thylakoid membranes
D. Inner membrane of chloroplast

**Q.54 Formation of ATP at respiratory chain is called:**

A. Cyclic photophosphorylation
B. Non-cyclic photophosphorylation
C. Substrate level phosphorylation
D. Oxidative phosphorylation

**Q.55 Synthesis of ATP in presence of oxygen is called:**

A. Phosphorylation
B. Photophosphorylation
C. Substrate level phosphorylation
D. Oxidative phosphorylation

**Q.56 Considering following pairs of respiratory chain, first one is reduced and 2nd one is oxidized in all except:**

A. Coenzyme Q – NADH
B. Cytochrome b – Coenzyme Q
C. Cytochrome c – Cytochrome b
D. Cytochrome c – Cytochrome a

**Q.57 Carriers of the respiratory chain are located in/on:**

A. Outer membrane of mitochondria
B. Matrix of mitochondria
C. Inner membrane of mitochondria
D. Inter membranous space

**Q.58 How many electrons are removed when one NADH is oxidized through respiratory chain?**

A. 1
B. 2
C. 3
D. 4

**Q.59 Final acceptor of electrons in respiratory chain is:**

A. CoQ
B. Cytochrome a3
C. ATP
D. Oxygen

**Q.60 During cellular respiration, increased level of ATP will inhibit most commonly:**

A. Glucokinase
B. Phosphofructokinase
C. Pyruvate decarboxylase
D. Succinate dehydrogenase

**Q.61 _____ percentage of total world photosynthesis is done by terrestrial plants:**

A. 10
B. 40
C. 70
D. 90

**Q.62 Chlorophyll a maximally absorbs:**

A. Violet
B. Blue
C. Orange
D. Red

**Q.63 Photosynthetic pigments are the substances that absorb visible light with wavelength:**

A. 350–750 nm
B. 380–750 nm
C. 350–780 nm
D. 380–780 nm

**Q.64 Which two elements are common in porphyrin and phytol of chlorophyll?**

A. Carbon & Nitrogen
B. Carbon & Oxygen
C. Carbon & Hydrogen
D. Carbon & Magnesium

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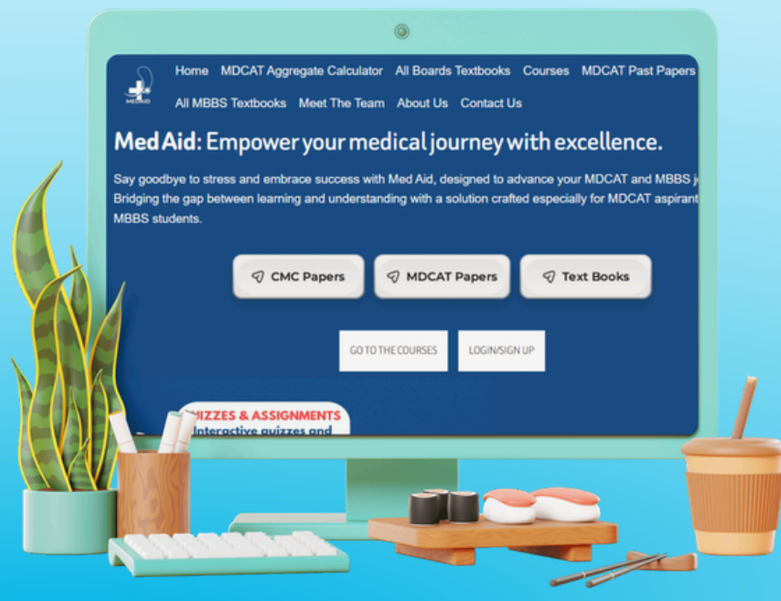


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**Q.65 Graph showing relative effectiveness of different wavelengths in photosynthesis is:**

A. Relative spectrum
B. Absorption spectrum
C. Action spectrum
D. Photosynthetic spectrum

**Q.66 Absorption peaks of chlorophyll are:**

A. Highest at red than at blue
B. Highest at blue than at red
C. Highest at green and yellow
D. Equally highest peaks at red and blue

**Q.67 It is not an accessory pigment of photosynthesis:**

A. Carotenes
B. Chlorophyll a
C. Chlorophyll b
D. Xanthophylls

**Q.68 All of the following are related to head of chlorophyll except:**

A. Flat and square
B. Absorbs light
C. Hydrophilic
D. Anchoring part

**Q.69 The wavelength of visible light that is most absorbed by carotenoids is:**

A. Blue-violet
B. Green-yellow
C. Yellow-orange
D. Red-orange

**Q.70 Nitrogen is present in _____ of chlorophyll molecule:**

A. Hydrophilic region
B. Tail portion
C. Phytol ring
D. Hydrophobic end

**Q.71 Maximum range of wavelength absorbed by chlorophyll b is:**

A. 300-400 nm
B. 400-500 nm
C. 500-600 nm
D. 600-700 nm

**Q.72 Source of oxygen released during photosynthesis is _____ not _____.**

A. Water and $CO_2$ respectively
B. $CO_2$ and water respectively
C. $CO_2$ and glucose respectively
D. Glucose and $CO_2$ respectively

**Q.73 Electron hole of chlorophyll in PS II is filled by electron that is extracted from:**

A. Water
B. Carbon dioxide
C. Plastocyanin
D. $NADPH_2$

**Q.74 Photoexcited electrons pass from PS II to PS I via:**

A. Chlorophyll a molecules
B. Chlorophyll b molecules
C. NADPH molecules
D. Electron transport chain

**Q.75 PSI reaction center chlorophyll involved in plants for photosynthesis is also called as:**

A. $P_{670}$
B. $P_{690}$
C. $P_{680}$
D. $P_{700}$

**Q.76 Which is an iron containing compound involved in light dependent phase of photosynthesis?**

A. Ferredoxin
B. Plastocyanin
C. $NADP^+$
D. Chlorophyll

**Q.77 All of the following are produced during light reactions of photosynthesis except:**

A. ATP
B. $O_2$
C. Glucose
D. NADPH

**Q.78 Correct sequence of flow of electrons during light reaction of photosynthesis:**

A. Cytochrome complex, Plastoquinone, Plastocyanin
B. Cytochrome complex, Plastocyanin, Plastoquinone
C. Plastoquinone, Cytochrome complex, Plastocyanin
D. Plastoquinone, Plastocyanin, Cytochrome complex

**Q.79 During chemiosmosis in photosynthesis, protons pumped from _____ to _____.**

A. Thylakoid lumen to stroma
B. Stroma to thylakoid lumen
C. Matrix to inter membranous space
D. Inter membranous space to matrix

**Q.80 In non-cyclic photophosphorylation, water molecules split, oxygen is released and an acceptor molecule takes up hydrogen. Which one of the following is the hydrogen acceptor?**

A. FAD
B. $NAD^+$
C. $NADP^+$
D. RuBP

**Q.81 During photosynthesis, light energy is captured by:**

A. Thylakoid membranes
B. Reaction center
C. Antenna complex
D. Stroma

**Q.82 All of the following mechanisms of ATP formation are associated with chemiosmosis except:**

A. Cyclic photophosphorylation
B. Non-cyclic photophosphorylation
C. Substrate level phosphorylation
D. Oxidative phosphorylation

**Q.83 A product of dark reaction of photosynthesis other than carbohydrate is:**

A. ATP
B. NADPH
C. $H_2O$
D. $O_2$

**Q.84 How many ATP are required to synthesize one glucose molecule through Calvin cycle?**

A. 6
B. 12
C. 9
D. 18

**Q.85 Net yield of water from photosynthesis during formation of glucose is:**

A. 0
B. 3
C. 6
D. 12

**Q.86 Carbohydrate that is produced directly from Calvin Cycle is:**

A. Glucose
B. Sucrose
C. G3P
D. DAP

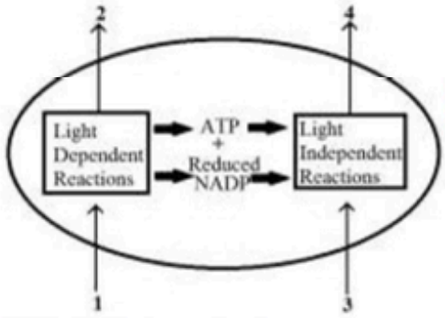
**Q.87 NADPH from light reactions are involved in _____ phase of Calvin cycle.**

A. Carbon fixation
B. Reduction
C. Regeneration of RuBP
D. All A, B, C

**Q.88 Carbon dioxide labeled with $^{14}C$ has been used to identify the intermediate compounds in the Calvin cycle, the light-independent stage in photosynthesis. Which compound would be the first to contain the $^{14}C$?**

A. Glucose
B. GP (PGA)
C. RuBP
D. Starch

**Q.89 The diagram shows the movement of substances into and out of a chloroplast:**




**What do labels 1 to 4 represent?**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| A. | $CO_2$ | ATP | $H_2O$ | Starch |
| B. | $CO_2$ | $H_2O$ | Sugars | $O_2$ |
| C. | $H_2O$ | $O_2$ | $CO_2$ | Sugars |
| D. | Sugars | $H_2O$ | ATP | $O_2$ |

**Q.90 The reactions of Calvin cycle take place at/in:**

A. Outer membrane of chloroplast
B. Inner membrane of chloroplast
C. Thylakoid membrane
D. Stroma of chloroplast

**Q.91 It is the molecular formula of lactate:**

A. $C_6H_{12}O_6$
B. $C_3H_4O_3$
C. $C_3H_5O_3$
D. $C_2H_5OH$

**Q.92 Cell processes pyruvic acid in three major ways. Which way depends on oxygen?**

A. Alcoholic fermentation
B. Lactic acid fermentation
C. Aerobic respiration
D. All A, B, C

**Q.93 Lactic acid fermentation occurs in:**

A. Smooth muscles
B. Cardiac muscles
C. Skeletal muscles
D. All A, B, C

**Q.94 It involves complete breakdown of glucose molecule:**

A. Aerobic respiration
B. Anaerobic respiration
C. Lactate fermentation
D. Alcoholic fermentation

**Q.95 Acetaldehyde is formed as an intermediate compound during:**

A. Aerobic respiration
B. Anaerobic respiration
C. Lactate fermentation
D. Ethanol fermentation

**Q.96 End product of preparatory phase of glycolysis is:**

A. Pyruvate
B. Lactate
C. G3P
D. $CO_2$ & $H_2O$

**Q.97 Stage of cellular respiration that essentially occurs in cytoplasm:**

A. Glycolysis
B. Krebs cycle
C. Pyruvic acid oxidation
D. Both A & B

**Q.98 A water molecule is released in glycolysis when:**

A. BPG converts into 3PG
B. 3PG converts into 2 PG
C. 2PG converts into PEP
D. PEP forms pyruvate

**Q.99 Which of the following molecule splits into trioses during glycolysis?**

A. Fructose 6-bisphosphate
B. Glucose 6-phosphate
C. Fructose 1, 3-bisphosphate
D. Fructose 1, 6-bisphosphate

**Q.100 All of the following changes are associated with pyruvate during pyruvic acid oxidation except:**

A. Oxidation
B. Dehydrogenation
C. Phosphorylation
D. Decarboxylation

**Q.101 Which process of cellular respiration generates more number of reduced $NAD^+$?**

A. Glycolysis
B. Link reaction
C. Krebs cycle
D. Oxidative phosphorylation

**Q.102 During Krebs cycle, conversion of succinate into fumarate give rise to:**

A. NADH
B. NADPH
C. $FADH_2$
D. ATP

**Q.103 Which of the following enters in Krebs cycle?**

A. Pyruvic acid
B. Acetyl co-A
C. Citric acid
D. G3P

**Q.104 Normally oxidative phosphorylation is coupled with:**

A. Chlorophyll
B. Thylakoids
C. Photosystem
D. Respiratory chain

**Q.105 Last molecule of ATP in respiratory chain is produced when:**

A. Cytochrome a3 is oxidized
B. Cytochrome a3 is reduced
C. Cytochrome a is oxidized
D. Cytochrome a is reduced

**Q.106 Out of 38 ATP molecules produced per glucose, 32 molecules are formed from $NADH^+H^+$ and $FADH_2$ via:**

A. Glycolysis
B. Oxidative decarboxylation
C. Krebs' cycle
D. Respiratory chain

**Q.107 Phase of cellular respiration during which NADH and FADH2 are oxidized:**

A. Glycolysis
B. Pyruvic acid oxidation
C. Krebs cycle
D. Respiratory chain

**Q.108 In electron transport chain, the electrons from NADH and $FADH_2$ are passed to:**

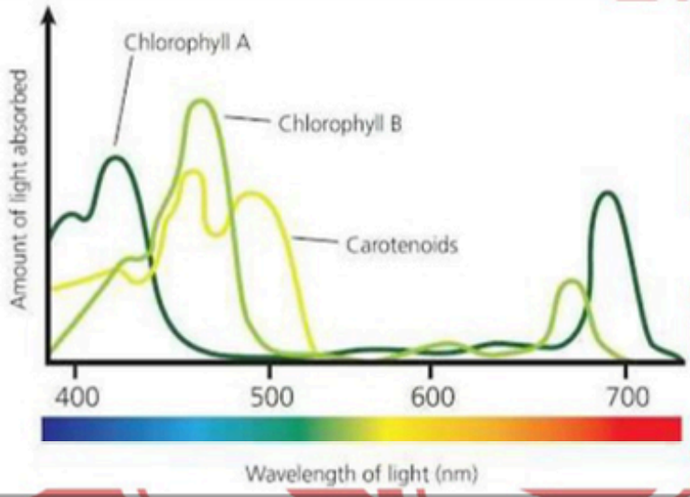
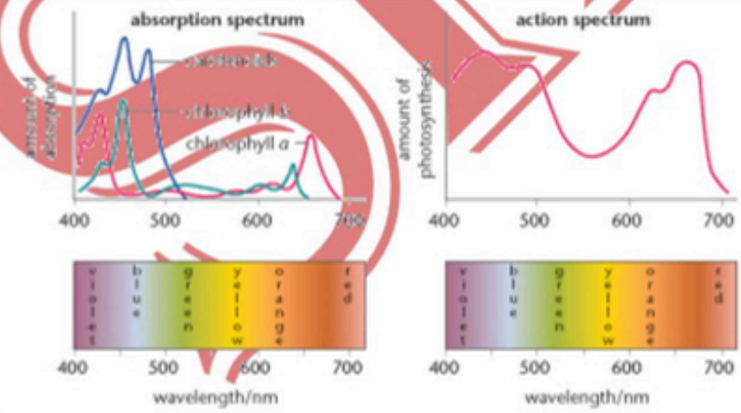
A. Cytochrome b
B. Cytochrome a
C. Cytochrome a3
D. Co-enzyme Q

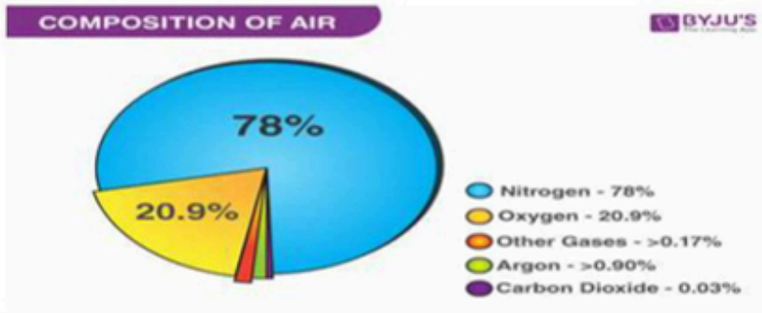
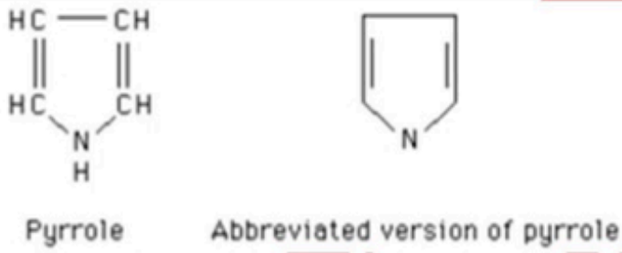
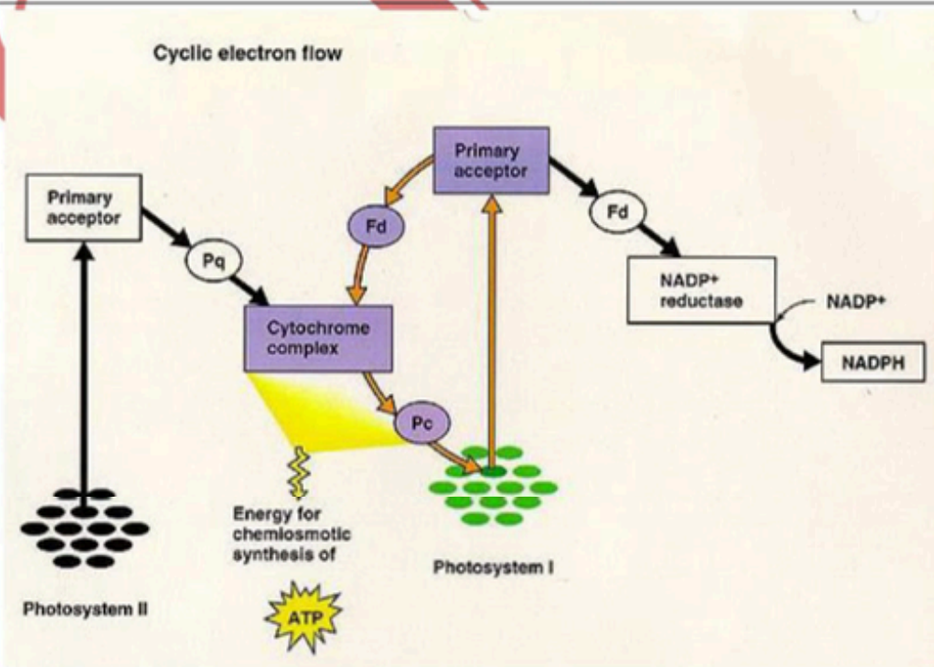
**Q.109 The final electron acceptor during oxidative phosphorylation is:**

A. Oxygen
B. Water
C. Electron carriers
D. Carbon dioxide

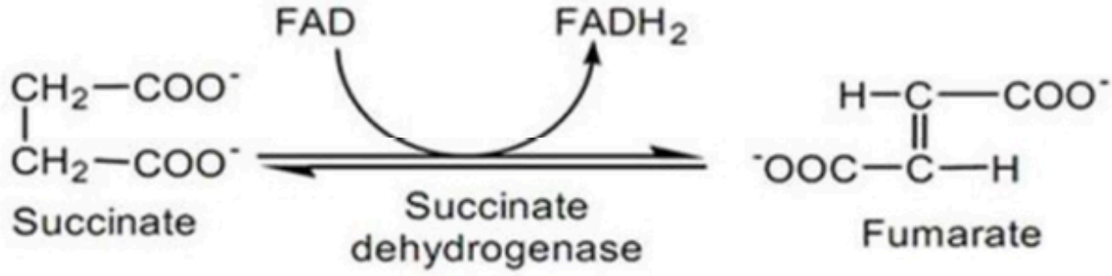
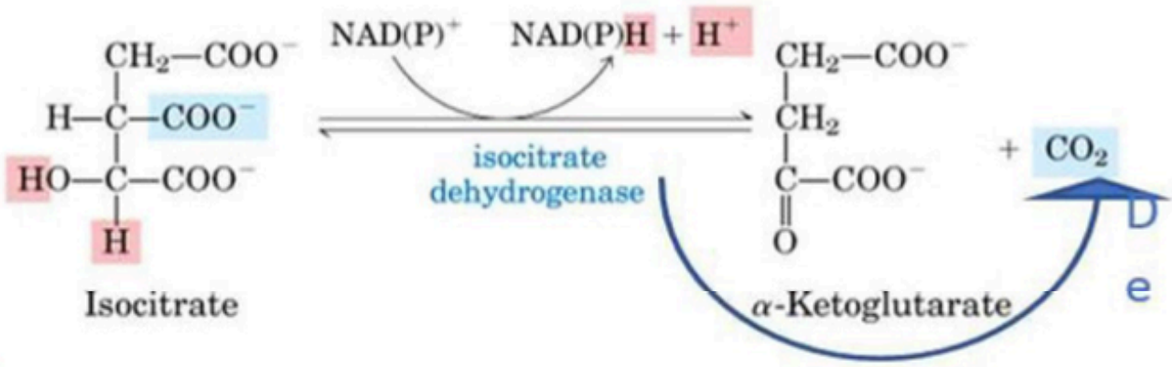
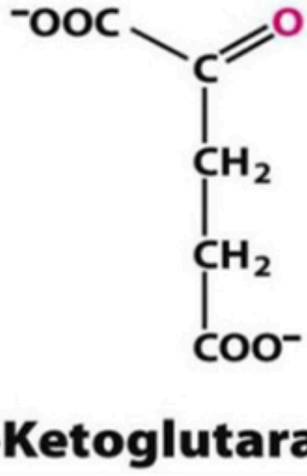
**Q.110 Pyruvate decarboxylase (an enzyme of cellular respiration) can be inhibited by:**

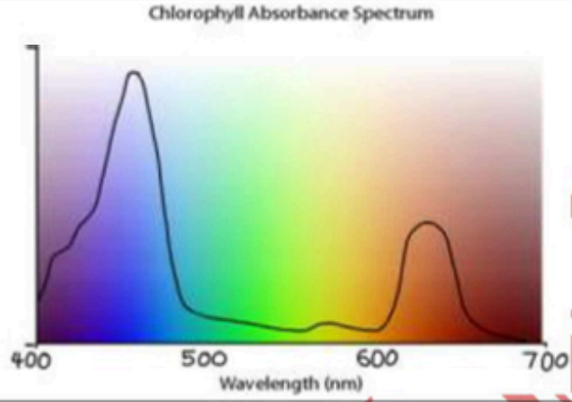
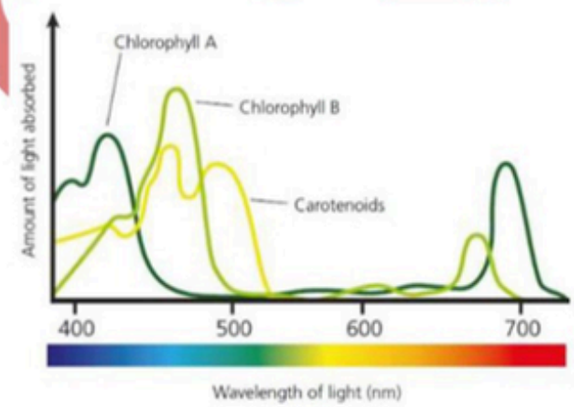
A. ↑ ATP
B. ↓ ATP
C. ↓ Citrate
D. ↑ NADH

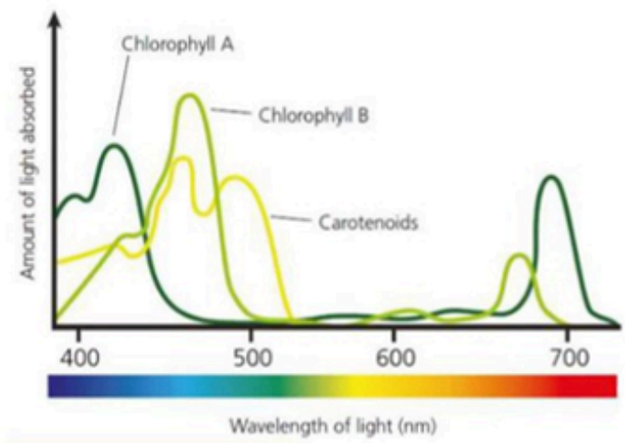
| ANSWER AND EXPLANTIONS | | |
|---|---|---|
| **Q.1** | **C** | **Photosynthesis**<br>carbon dioxide + water + energy → glucose + oxygen<br>$6CO_2 + 6H_2O +$ light energy $\rightarrow C_6H_{12}O_6 + 6O_2$<br>**Respiration**<br>glucose + oxygen → carbon dioxide + water + energy<br>$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O +$ ATP |
| **Q.2** | **C** | Photolysis of water provides protons for reduction of $NADP^+$ to $NADPH_2$ and oxygen is released as byproduct. |
| **Q.3** | **B** |  |
| **Q.4** | **B** | Accessary pigments absorb the wavelengths not absorbed by chlorophylls. |
| **Q.5** | **D** |  |
| **Q.6** | **C** | Chlorophylls and other pigments in chloroplast trap light energy and convert it into the chemical energy of ATP and reducing power of $NADPH_2$. |
| **Q.7** | **B** | Hydrogen containing species provide hydrogen for reduction of $CO_2$ to produce carbohydrate and release their other atoms. |
| **Q.8** | **D** | In water, photosynthetic organisms mostly not use atmospheric CO2 directly. |
| **Q.9** | **C** | Exchange of gases mainly occur through stomata of leaves. |

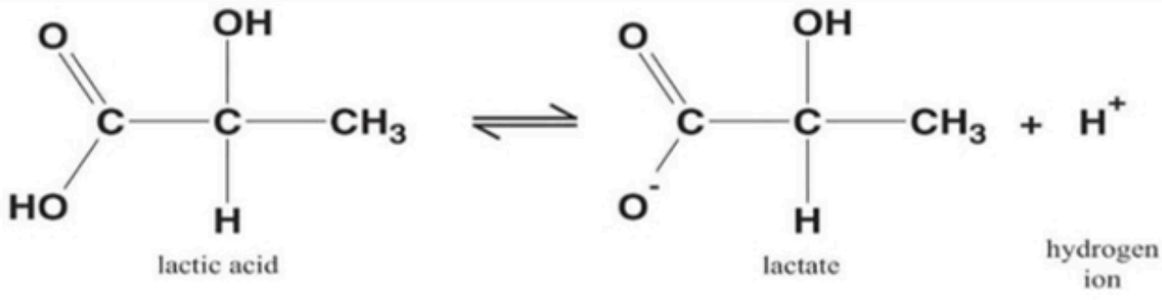
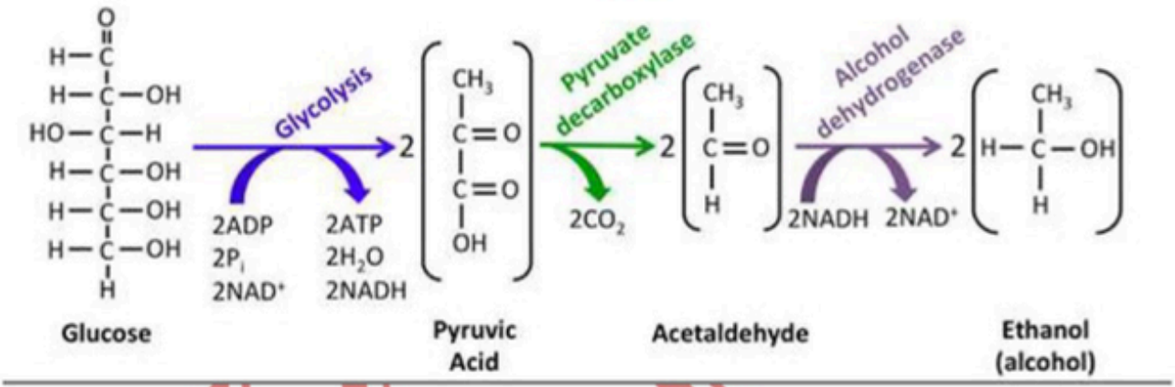
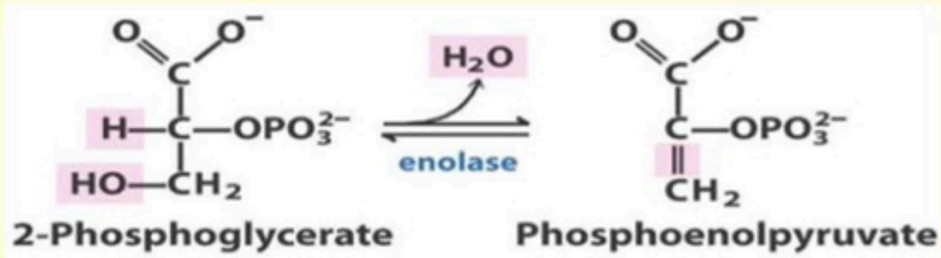
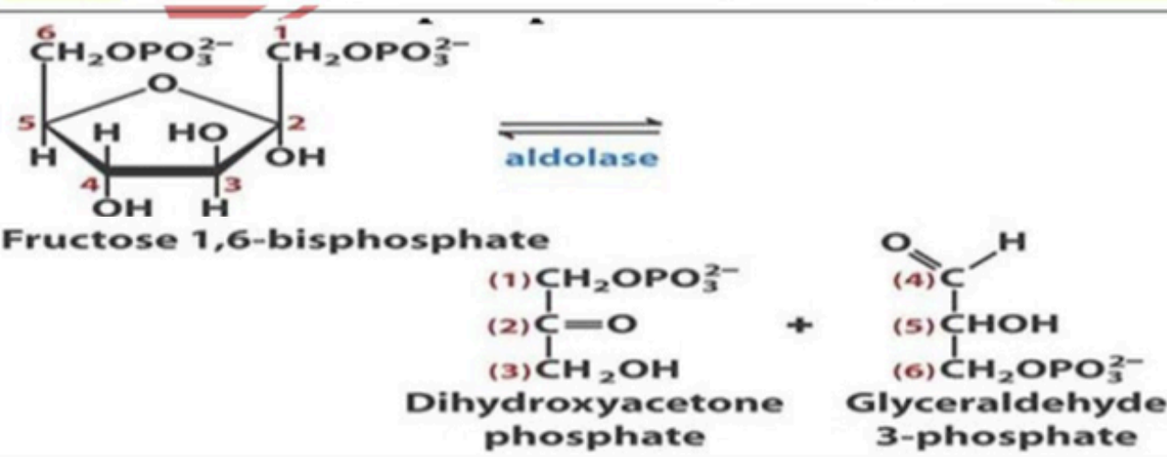
| | | |
|---|---|---|
| Q.10 | C |  |
| Q.11 | C | Accessary pigments/carotenoids are yellow and red to orange. |
| Q.12 | B | Four pyrrole rings join to form a Porphyrin ring that is light absorbing, hydrophilic head. |
| Q.13 | B | Chlorophyll a has $CH_3$. While chlorophyll b has CHO group. |
| Q.14 | D | Eukaryotic chlorophylls are present in chloroplasts and are different from bacteriochlorophylls. |
| Q.15 | B |  |
| Q.16 | C | Many molecules of chlorophyll a, chlorophyll b and carotenoids capture light energy in a photosystem and transfer towards reaction center. |
| Q.17 | C | Photosystem I has $P_{700}$ while photosystem II has $P_{680}$ chlorophyll in reaction center. |
| Q.18 | D | Chlorophyll a derives the conversion of light energy into chemical energy. |
| Q.19 | C | Photosynthetic pigments cluster together for efficient absorption and utilization of light energy. |
| Q.20 | D | Cyclic photophosphorylation is a short pathway involving only PS-I and ETC components. |
| Q.21 | D |  |
| Q.22 | A | In Cyclic photophosphorylation the excited electrons do not pass towards NADP reductase and hence $NADPH_2$ is not produced. |
| Q.23 | C | Chemiosmosis involves ATP synthesis by harnessing the energy stored in proton gradient by the transport of electrons through ETC. |

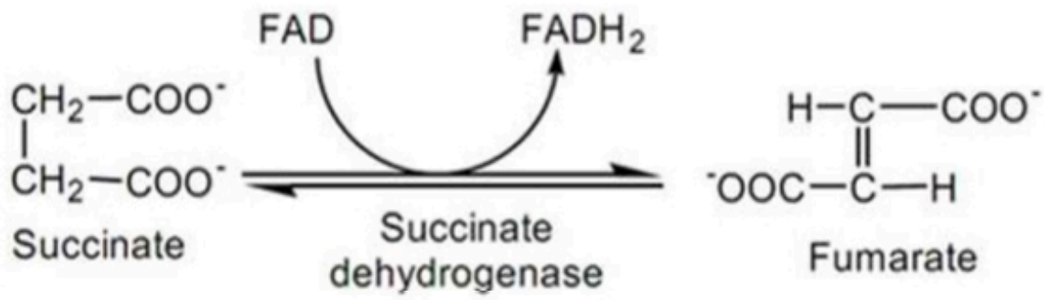
| | | |
|---|---|---|
| **Q.24** | **B** | Electrons flowing in non-cyclic flow is used for the reduction of $NADP^+$. |
| **Q.25** | **D** | Rubisco and other enzymes of Calvin cycle are present in stroma. |
| **Q.26** | **A** | Rubisco catalyzes the incorporation of $CO_2$ into RuBP in Calvin cycle and is the most abundant protein on earth. |
| **Q.27** | **D** | The products of light reaction i.e. 6NADPH and 6ATP, are used in steps of Calvin cycle that involves conversion of 3-PGA (3-phosphoglycerate) to PGAL (phosphoglyceraldehyde). |
| **Q.28** | **B** | Dark reaction leads to production of G3P which leaves the cycle and combine mutually to from glucose. |
| **Q.29** | **B** | In dark reaction NADPH is oxidized and its protons and electrons are used for the reduction process. |
| **Q.30** | **A** | Hydrogen for the reduction of NADP comes from the splitting of water in light reaction, whereas the source of hydrogen for the $CO_2$ reduction is NADPH, so it is reduced in dark reaction |
| **Q.31** | **A** | Mitochondria are the sites of aerobic respiration. Fermentation occurs in the absence of oxygen in cytosol. |
| **Q.32** | **D** | C-H bonds in glucose are broken step by step during oxidation releasing energy. |
| **Q.33** | **D** | In the cell glucose is metabolized by respiratory enzymes and electron carriers for releasing energy. |
| **Q.34** | **C** | Living organisms need energy to carry on their vital activities. This energy is provided from within the cells by the phenomenon of respiration. Respiration is the universal process by which organisms' breakdown complex compounds containing carbon in a way that allows the cells to harvest a maximum of usable energy. |
| **Q.35** | **B** | Glucose is oxidized during respiration. |
| **Q.36** | **B** | Lactic acid and alcoholic fermentation are due to the absence of oxygen, if oxygen is present then the preferable mode is aerobic respiration. |
| **Q.37** | **D** | In the absence of oxygen pyruvate is reduced to lactic acid or alcohol. |
| **Q.38** | **C** | ▪ **Total ATP Yield**<br>**02 ATP - glycolysis (substrate-level phosphorylation)**<br>**06 ATP - converted from 2 NADH - glycolysis**<br>**06 ATP - converted from 2 NADH - grooming phase**<br>**02 ATP - Krebs cycle (substrate-level phosphorylation)**<br>**18 ATP - converted from 6 NADH - Krebs cycle**<br>**04 ATP - converted from 2 $FADH_2$ - Krebs cycle**<br>**38 ATP - TOTAL** |
| **Q.39** | **D** | As the reactants of the photosynthesis are those that are products of respiration and vice versa.<br>Photosynthesis: **$6CO_2 + 12H_2O$ + light energy $C_6H_{12}O6 + 6O_2 + 6H_2O$**<br>Respiration: **$C_6H_{12}O_6 + 6O_2$ $6CO_2 + 6H_2O$ + energy** |
| **Q.40** | **A** | The correct sequence along with the final products in above sequences is A. |
| **Q.41** | **A** | Breakdown of glucose to pyruvate uses energy of ATP in first phase and does not require oxygen. |
| **Q.42** | **B** | First step of glycolysis is the formation of glucose-6-phosphate. |

| | | |
|---|---|---|
| **Q.43** | **A** | Conversion of Glucose to Glucose-6-phosphate and of fructose-6-phosphate to fructose-1,6-bisphosphate occurs by gaining phosphate and energy from ATP. |
| **Q.44** | **B** | In oxidative phase, 4 ATP molecules, 2 H2O and 2 NADH are formed but 2 ATP are also used in the preparatory phase. |
| **Q.45** | **D** | Acetic acid formed from pyruvate is first activated by Coenzyme A for entering in Krebs cycle. |
| **Q.46** | **C** |  |
| **Q.47** | **C** | $NAD^+$ mediated oxidation takes place thrice, resulting in the formation of three NADH. |
| **Q.48** | **A** | During one Krebs cycle, one molecule of GTP is produced which is Similar to ATP and can be easily converted to ATP in the cell. |
| **Q.49** | **D** |  |
| **Q.50** | **C** |  <br>**α-Ketoglutarate** |
| **Q.51** | **D** | Final acceptor of electrons in respiratory chain is an atom of oxygen which combines with $2H^+$ to form water. |
| **Q.52** | **C** | In respiratory chain Co-enzyme Q receives electrons from NADH directly. |
| **Q.53** | **B** | In Oxidative phosphorylation the protons are pumped across inner mitochondrial membrane while in photophosphorylation protons are pumped across thylakoid membrane to the lumen of thylakoid. |
| **Q.54** | **D** | In respiratory chain phosphorylation occurs in the presence of oxygen. |
| **Q.55** | **D** | In respiratory chain phosphorylation occurs in the presence of oxygen. |

| | | |
|---|---|---|
| **Q.56** | **D** | Cytochrome c is oxidized by cytochrome a in the respiratory chain. |
| **Q.57** | **C** | Respiratory chain carriers are located on inner mitochondrial membrane. |
| **Q.58** | **B** | NADH splits to $NAD^+$ & $H^+$ and both electrons of their covalent bond are removed. |
| **Q.59** | **D** | Oxygen is the most electronegative substance and present at the bottom of the respiratory chain, oxidizes the cytochrome a3. |
| **Q.60** | **B** | The increase in ATP concentration in glycolysis exerts negative feedback on glycolysis |
| **Q.61** | **A** | Only 10% occur by terrestrial plants rest occur in oceans lake and ponds |
| **Q.62** | **A** |  |
| **Q.63** | **B** | Visible part of electromagnetic spectrum is useful for photosynthesis. |
| **Q.64** | **C** | Phytol is hydrocarbon (Carbon + Hydrogen) tail containing the elements also found in Porphyrin. |
| **Q.65** | **C** | Different wavelengths are not only differently absorbed but are also differently effective in driving the photosynthetic process. |
| **Q.66** | **B** | Chlorophyll molecule shows two peaks corresponding to absorption of wavelengths. One peak is at 430nm (blue) and second is at 670nm (red). |
| **Q.67** | **B** | Accessary pigments are not directly involved in light dependent reactions of photosynthesis. |
| **Q.68** | **D** | Hydrocarbon phytol tail anchors the chlorophyll to thylakoids. |
| **Q.69** | **A** |  |
| **Q.70** | **A** | Porphyrin ring is made of four joined smaller nitrogen containing pyrrole rings coordinated with $Mg^{+2}$. |

| | | |
|---|---|---|
| **Q.71** | **B** |  |
| **Q.72** | **A** | In light reaction, water breaks during photolysis and releases oxygen is released as by product. |
| **Q.73** | **A** | Hole containing reaction center chlorophyll of PS II is strong oxidizing agent and extracts electrons by splitting water in the absence of light with the help of an enzyme (photolysis). |
| **Q.74** | **D** | Primary electron acceptor of PS-II transfers its electrons through a series of electron carriers towards PS-I. |
| **Q.75** | **D** | Photosystem I has chlorophyll a molecule which shows absorbing peak at wavelength of 700 nm, that's why it is named as $P_{700}$. |
| **Q.76** | **A** | Chlorophyll contains magnesium, plastocyanin contains copper while ferridoxin is iron containing protein. |
| **Q.77** | **C** | $CO_2$ is not reduced to carbohydrates in light reactions of photosynthesis. |
| **Q.78** | **C** | ETC of PS-II contains electron carriers Plastoquinone, cytochrome complex and plastocyanin. |
| **Q.79** | **B** | Protons are pumped due to the energy of moving electron from stroma into the interior thylakoid space. |
| **Q.80** | **C** | During non-cyclic photophosphorylation, $NADP^+$ takes up hydrogen and is converted into $NADPH^+H$ |
| **Q.81** | **C** | Antenna complex consist of many molecules of chlorophyll a, chlorophyll b and carotenoids. Antenna complex transfers solar energy to reaction centre where it is converted into chemical energy. |
| **Q.82** | **C** | Chemiosmosis is the mechanism of phosphorylation in which movement of H+ across a membrane (thylakoid / Inner mitochondrial) results in ATP synthesis. |
| **Q.83** | **C** | $6CO_2 + 12NADPH + 18ATP + 12H_2O \rightarrow Glucose + 12NADP^+ + 18ADP + 18Pi + 6H_2O$ |
| **Q.84** | **D** | One Calvin cycle uses 9 ATPs and glucose is produced by joining the product of 2 cycles. |
| **Q.85** | **A** | The product of Calvin cycle is G3P, not the glucose and glucose is formed by joining the two molecules of G3P during which no water is produced. |
| **Q.86** | **C** | Final product of Calvin cycle in not glucose but a 3 carbon phosphorylated aldehyde. |
| **Q.87** | **B** | NADPH provides protons and electrons for reduction of 1,3-BPG. |
| **Q.88** | **B** | $^{14}C$ will appear in first stable product formed in Calvin cycle. |
| **Q.89** | **C** | In light reaction water is splitted releasing oxygen and in dark reaction CO2 is used and sugars are produced. |
| **Q.90** | **D** | Stroma contains Rubisco and other enzymes for reduction of CO2 -to carbohydrates. |

| | | |
|---|---|---|
| **Q.91** | **C** |  |
| **Q.92** | **C** | Respiration in the presence of oxygen is called aerobic respiration. |
| **Q.93** | **C** | During hard muscular work oxygen is not provided in the required amount so the breakdown of pyruvate proceeds anaerobically. |
| **Q.94** | **A** | Glucose is completely oxidized to $CO_2$ and $H_2O$ in the presence of oxygen. |
| **Q.95** | **D** |  |
| **Q.96** | **C** | In first phase of glycolysis glucose splits to form PGAL (G3P) and DAP which is also converted to PGAL (G3P) for use second phase of glycolysis. |
| **Q.97** | **A** | As the enzymes for this process is present in the cytoplasm in dissolved form that's why it essentially occurs in both pro and eukaryotes. |
| **Q.98** | **C** | **Step 9: Dehydration of 2-PG to phosphoenolpyruvate (PEP)**<br>  |
| **Q.99** | **D** |  |
| **Q.100** | **C** | Pyruvate is converted into activated form due to oxidation, dehydrogenation and decarboxylation ultimately joining with Coenzyme A and no phosphorylation occurs. |

| | | |
|---|---|---|
| **Q.101** | **C** | Glycolysis produces 2 NADH while in Krebs cycle total 6 NADH are produced during cellular respiration of glucose. |
| **Q.102** | **C** |  |
| **Q.103** | **B** | Pyruvate oxidation generates Acetyl Co-A which enters Krebs cycle. |
| **Q.104** | **D** | Phosphorylation takes place when electrons extracted from NADH move through the respiratory chain. |
| **Q.105** | **A** | Cytochrome $a_3$ transfers its electrons to atomic oxygen which rapidly combines with $2H^+$ to form $H_2O$. |
| **Q.106** | **D** | Total no. of NADH + H+ formed = 10 = 30 ATPs<br>Total no. of FADH2 formed = 2 = 4 ATPs<br>Total ATPs formed from these compounds = 34<br>ATPs used to transfer two pyruvates to mitochondria = 2<br>So net gain of ATPs from $NADH+H^+$ & $FADH_2$ = 32 |
| **Q.107** | **D** | NADH & $FADH_2$ are oxidized in respiratory chain. |
| **Q.108** | **D** | First electron acceptor in respiratory chain is Coenzyme Q. |
| **Q.109** | **A** | Oxygen extracts electrons from cytochrome $a_3$ and combines with $2H^+$ to form water in the last step of respiratory chain. |
| **Q.110** | **D** | NADH is the product of pyruvate oxidation and negatively regulates the reaction. |

# Nutrition and Gas Exchange

## Modes of nutrition, Carnivorous plants

**Q.1 All the insectivorous plants are:**
A. True autotrophs
B. True heterotrophs
C. True saprotrophs
D. True absorptive heterotrophs

**Q.2 All the insectivorous plants are:**
A. Heterotrophic
B. Autotrophic
C. Decomposers
D. Parasites

**Q.3 In plant mineral nutrition, elements are called macro and micro depending upon their:**
A. Relative amount required in plants
B. Relative presence in plant ash
C. Relative importance in plant growth
D. Relative availability in soil

**Q.4 In plants, common symptom caused by deficiency of P, K, Ca and Mg is:**
A. Bending of leaf tip
B. Appearance of dead necrotic areas
C. Formation of anthocyanin
D. Poor development of vasculature

**Q.5 Which of the following is a mode of mineral absorption in plants?**
A. Imbibition
B. Active transport
C. Osmosis
D. Plasmolysis

**Q.6 The mode of nutrition in which one organism obtains nutrition from other organisms is known as:**
A. Symbiosis
B. Heterotrophic nutrition
C. Autotrophic nutrition
D. Saprophytic nutrition

**Q.7 The mutualistic association between certain fungi and roots of vascular plants are known as:**
A. Rhizoids
B. Haustoria
C. Mycelium
D. Mycorrhizae

**Q.8 Insectivorous plants usually grow in soil with poor nutrients hence they get nutrients to grow healthily by:**
A. Movement of leaves
B. Trapping an insect
C. Absorbing more water
D. Opening stomata

**Q.9 Pick out the different:**
A. Dodder
B. Sundew
C. Venous fly trap
D. Pitcher plant

**Q.10 End of leaf is modified to form a hood in:**
A. Sarracenia purpurea
B. Drosera intermedia
C. Dionaea muscipula
D. All of these

## Digestion in Oral Cavity, Digestion in Stomach

**Q.11 Slimy liquid which serves to moisten and lubricate the food in buccal cavity is mainly made of:**
A. Water & Mucus
B. Mucus & Amylase
C. Water & $NaHCO_3$
D. $NaHCO_3$ & Mucus

**Q.12 Main functions of oral cavity accomplished by saliva are:**
A. Selection & swallowing
B. Lubrication & digestion
C. Grinding & mastication
D. Selection & detoxification

**Q.13 Tongue is involved in selection of food through its:**
A. Muscles
B. Taste buds
C. Bones
D. Secretions

**Q.14 All of the following are characters of bolus except:**
A. Softened
B. Partly digested
C. Slimy mass
D. Hard mass

**Q.15 It produces saliva with mucus only:**
A. Parotid glands
B. Sublingual glands
C. Submaxillary glands
D. Submandibular glands

**Q.16 It protects to our body by killing microorganisms:**

A. Salivary amylase
B. Mucus
C. HCl
D. Pepsinogen

**Q.17 The muscles of the stomach walls thoroughly mix up the food with gastric juices and the resultant semi-solid/ semi-liquid material is called:**

A. Bolus
B. Chyle
C. Mucus
D. Chyme

**Q.18 Which of the following cell is involved in protein breakdown within stomach?**

A. Parietal cells
B. Epithelial cells
C. Oxyntic cells
D. Chief cells

**Q.19 Secretion of gastric juice is regulated by:**

A. Nervous system
B. Endocrine system
C. Quality of food
D. All A, B, C

**Q.20 Transfer of food from stomach to esophagus is prevented by:**

A. Cardiac sphincter
B. Pyloric sphincter
C. Ileocolic sphincter
D. Esophageal

## Digestion in Small Intestine and Accessory Glands, Disorders of digestive tract & Digestion in Large intestine

**Q.21 What is dissimilar between trypsin and pepsin?**

A. Trypsin works in basic medium but pepsin in acidic medium
B. Pepsin works in aqueous medium but trypsin may act in any medium
C. Pepsin digest proteins but trypsin acts on amino acids
D. Pepsin acts in stomach but trypsin in pancreas

**Q.22 Function of gall bladder is:**

A. Storage of bile
B. Production of bile
C. Secretion of enzymes
D. Formation of bile salts

**Q.23 Substrate for amino peptidase is:**

A. Amino acid
B. Dipeptide
C. Polypeptide
D. Protein

**Q.24 The movement of digested products and water across the GI tract epithelium and into the underlying blood and lymphatic vessels is called:**

A. Ingestion
B. Digestion
C. Assimilation
D. Absorption

**Q.25 Defecation reflex can be consciously inhibited in:**

A. Infants only
B. Adults only
C. Males only
D. Females only

**Q.26 It is a sphincter in human alimentary canal that contains voluntary muscles:**

A. Cardiac sphincter
B. Pyloric sphincter
C. Ileocolic sphincter
D. Anal sphincter

**Q.27 Which of the following is not related to large intestine?**

A. Absorption of food
B. Synthesis of vitamins
C. Goblet cells
D. Storage

**Q.28 Food poisoning can induce:**

A. Peristalsis
B. Constipation
C. Antiperistalsis
D. Hunger pangs

**Q.29 Certain cells of our body accumulate drops of fat in their:**

A. Nucleus
B. Vacuole
C. Cytoplasm
D. SER

**Q.30 Excess fat is stored in adipose tissue:**

A. In abdomen
B. Around kidneys
C. Under the skin
D. All A, B, C

## Human respiratory system, Mechanism of Breathing

**Q.31 Filtration in air passage way is carried out by:**

A. Hair only
B. Mucus only
C. Both hair & mucus
D. Hair, mucus & cilia

**Q.32 Voice producing organ in humans is _____but speech production is function of_____.**

A. Larynx, Nasal cavities
B. Larynx, Pharynx
C. Larynx, Tongue and lips
D. Pharynx, Tongue and lips

**Q.33 During swallowing, glottis is:**

A. Completely closed
B. Partly closed
C. Completely open
D. Horizontal in position

**Q.34 Large dust particles are trapped by:**

A. Hair in nostrils
B. Mucus in nostrils
C. Cilia in nostrils
D. Both hair & mucus in nostrils

**Q.35 Cartilaginous rings in respiratory passage are present in:**

A. Trachea only
B. Trachea and initial bronchi only
C. Trachea, bronchi and initial bronchioles
D. Bronchi and bronchiole only

**Q.36 Rate of breathing in an adult human at rest is:**

A. 10-15/min
B. 15-20/min
C. 20-25/min
D. 25-30/min

**Q.37 In expiration, air with _____ content moves out of the lungs:**

A. Low $O_2$ & low $CO_2$
B. High $O_2$ & high $CO_2$
C. High $O_2$ & low $CO_2$
D. Low $O_2$ & high $CO_2$

**Q.38 During inspiration, there is _____ of lungs:**

A. Passive contraction
B. Passive expansion
C. Active contraction
D. Active expansion

**Q.39 The rate and pattern of breathing is controlled by:**

A. Lungs
B. Bronchi
C. Medulla
D. Pons

**Q.40 A change that is related to inspiration in humans is:**

A. Floor of buccal cavity is raised
B. Ribs move inward and downward
C. Lungs are inflated
D. Diaphragm becomes dome shaped

## Transport of Respiratory Gases and Respiratory Pigments

**Q.41 At oxygen tension of 115 mmHg, hemoglobin is _____ saturated:**

A. 100%
B. 98%
C. 96%
D. 90%

**Q.42 Carbaminohemoglobin is formed when carbon dioxide combines with:**

A. Heme portion of hemoglobin
B. Globin portion of hemoglobin
C. Amino group of hemoglobin
D. Carboxyl group of hemoglobin

**Q.43 About 70% carbon dioxide is carried as bicarbonate ions combined with:**

A. Sodium in corpuscles
B. Sodium in plasma
C. Potassium in corpuscles
D. Potassium in plasma

**Q.44 What happens when pH of blood is increased?**

A. The delivery of oxygen to tissues is increased
B. More $O_2$ binds to Hemoglobin
C. Hemoglobin is denatured
D. $O_2$ binding remains unaffected

**Q.45 Hemoglobin can bind with all except:**

A. $O_2$
B. CO
C. $CO_2$
D. $N_2$

**Q.46 Plasma proteins carry _____ carbon dioxide from the body fluids to the capillaries of lungs:**

A. 5%
B. 10%
C. 20%
D. 70%

**Q.47 During shock conditions, in arterial blood:**

A. $pO_2$ is reduced
B. $pCO_2$ is reduced
C. $pO_2$ is increased
D. $pO_2$ remains normal

**Q.48 The original colour of haemoglobin is:**

A. Bright red
B. Purple red
C. Purple yellow
D. Red

**Q.49 It is more soluble in plasma as compared to others:**

A. Oxygen
B. Carbon dioxide
C. Nitrogen
D. Carbon monoxide

**Q.50 When hemoglobin is 98% saturated, 100 ml of blood contains:**

A. 19 ml $O_2$
B. 19.6 ml $O_2$
C. 20 ml $O_2$
D. 18.6 ml $O_2$

## Lung capacities, Respiratory Disorders

**Q.51 Air that cannot be expelled out of lungs even during exercise is:**

A. Inspiratory volume
B. Tidal volume
C. Residual volume
D. Forced expiratory volume

**Q.52 If you exhale to your full capacity, how much air would be still available in your lungs?**

A. 500 ml
B. 3.5 Liters
C. 1.5 liters
D. 5 liters

**Q.53 Respiratory distress syndrome (RDS) occurs because of:**

A. Inability of expansion of lungs
B. Premature birth
C. Reduced surface tension
D. Deficiency of surfactant

**Q.54 In an adult human being when the lungs are fully inflated, the total inside capacity of lungs is about:**

A. 0.5 litre
B. 1.5 litre
C. 3.5 litre
D. 5.0 litre

**Q.55 It is a contagious disease:**

A. Cancer
B. Tuberculosis
C. Asthma
D. Emphysema

**Q.56 Lung cancer is an example of:**

A. Benign tumor with no growth
B. Benign tumor with limited growth
C. Malignant tumor with limited growth
D. Malignant tumor with unlimited growth

**Q.57 In this condition the alveoli are larger but surface area for oxygenation is less:**

A. Carcinoma
B. Asthma
C. Emphysema
D. Tuberculosis

**Q.58 Myoglobin transfers oxygen from:**

A. Alveoli to RBC
B. Haemoglobin to plasma
C. Plasma to muscle cell
D. Haemoglobin to muscle cell

**Q.59 Hemoglobin in man increases the oxygen carrying capacity of the blood to about:**

A. 20 times
B. 25 times
C. 75 times
D. 100 times

**Q.60 Hemoglobin in humans is found in:**

A. Plasma
B. RBCs
C. WBCs
D. Platelets

**Q.61 On the basis of mode of nutrition, organisms can be divided into:**

A. Two groups
B. Three groups
C. Four groups
D. Five groups

**Q.62 Salivary glands which pour their secretions in posterior portion of oral cavity are:**

A. Parotid glands
B. Sublingual glands
C. Submaxillary glands
D. Submandibular glands

**Q.63 Molar teeth in humans are involved in:**

A. Lubrication
B. Swallowing
C. Mechanical digestion
D. Chemical digestion

**Q.64 The beginning of the swallowing action is:**

A. Automatic
B. Involuntary
C. Voluntary
D. Peristalsis

**Q.65 During swallowing:**

A. Tongue moves upward and forward
B. Epiglottis becomes dome shaped
C. Soft palate is pushed up
D. Larynx moves downward

**Q.66 During swallowing, which of the following event will not occur?**

A. Epiglottis becomes more horizontal
B. Glottis constricts
C. Soft palate moves down
D. Larynx moves upward

**Q.67 Which of the following gland is mismatched with respect to its location:**

| | Gland | Location |
|---|---|---|
| A. | Buccal glands | Hard palate |
| B. | Parotid glands | Front of ears |
| C. | Sublingual glands | Below tongue |
| D. | Sub Maxillary | Behind jaws |

**Q.68 All of the following are true about swallowing except**

A. Epiglottis covers glottis
B. Soft pallet moves upward
C. Tongue moves backward
D. Trachea moves downward

**Q.69 These salivary gland pours their secretions at posterior portion of oral cavity:**

A. Parotid gland
B. Submandibular gland
C. Submaxillary gland
D. Sublingual gland

**Q.70 Tubular gastric glands of stomach secrete all of the following except:**

A. Mucus
B. HCl
C. Pepsinogen
D. Gastrin

**Q.71 Which food would be a good stimulus for release of pepsinogen from gastric glands?**

A. Milk
B. Cereals
C. Meat
D. Fruits

**Q.72 Which component of gastric secretion is more damaging to stomach if protective mucus layer is broken?**

A. Dilute HCl
B. Pepsinogen
C. Chloride ions
D. Pepsin

**Q.73 Gastrin is secreted from which part of stomach:**

A. Antrum
B. Pylorus
C. Fundus
D. Body

**Q.74 Secretions of which gland(s) is/are transported through a duct into first part of small intestine?**

A. Liver
B. Pancreas
C. Lacrimal
D. Both A & B

**Q.75 Jaundice may be caused due to accumulation of _____ in blood.**

A. Hemoglobin
B. Bile salts
C. Bile pigments
D. Cholesterol

**Q.76 Goblet cells in intestine are involved in protection by:**

A. HCl
B. $NaHCO_3$
C. Mucus
D. Serous

**Q.77 Only secretion that contains enzymes for digestion of all three major components of food is:**

A. Saliva
B. Bile
C. Gastric juice
D. Pancreatic juice

**Q.78 The end product of maltose digestion is:**

A. Glucose only
B. Glucose and Galactose
C. Glucose and fructose
D. Fructose only

**Q.79 Fatty acids and glycerol recombine to form fat in:**

A. Ileum
B. Epithelial cells of villi
C. Lymph vessels
D. Blood vessels

**Q.80 Fats are transported in form of lipoproteins from digestive tract. These lipoproteins are formed:**

A. Inside ileum
B. In lumen of villus
C. In epithelial cells of villus
D. In lymph vessels

**Q.81 Bacteria that produce vitamin K in our intestine are present in:**

A. Colon
B. Anus
C. Caecum
D. Ileum

**Q.82 Ileocolic sphincter is present between:**

A. Ileum and jejunum
B. Ileum and duodenum
C. Ileum and caecum
D. Ileum and rectum

**Q.83 Large intestine in human is divided into _____ main segments.**

A.
B. 3
C. 5
D. 7

**Q.84 Following is not true about vitamin K:**

A. Produced by bacteria
B. Produced in human large intestine
C. Involved in blood clotting
D. Water soluble vitamin

**Q.85 Bronchioles are mainly made up of:**

A. Cartilage rings
B. Cartilage plates
C. Circular smooth muscles
D. Longitudinal smooth muscles

**Q.86 Division of trachea forms:**

A. Bronchi
B. Bronchioles
C. Trachioles
D. Air sacs

**Q.87 Which of the following is irrelevant in context of human lungs?**

A. Major part of pulmonary circulation
B. Largest organs in human body
C. Organs involved in acid base balance
D. Organs involved in gaseous exchange

**Q.88 Pick the one that does not describe the function of pleura:**

A. Encases and protects the lungs
B. Stops leaking of air into thoracic cavity
C. Reduces friction between lungs and thorax
D. Protects the lungs from pathogens

**Q.89 Nasal cavity transfers air from nostrils to:**

A. Buccal cavity
B. Throat
C. Trachea
D. Bronchi

**Q.90 Role of cartilage rings in trachea is to:**

A. Allow gaseous exchange
B. Humidify air
C. Prevent collapse
D. Prevent entry of food

**Q.91 Cartilage is not found in:**

A. Trachea
B. Bronchioles
C. Bronchi
D. Larynx

**Q.92 All of the following are true for expiration except:**

A. Diaphragm is relaxed
B. Rib cage is lowered
C. Lung volume decreases
D. Pressure on lungs decreases

**Q.93 During inspiration:**

A. Diaphragm contracts, intercostal muscles relax, rib cage is elevated
B. Diaphragm contracts, intercostal muscles relax, rib cage is lowered
C. Diaphragm contracts, intercostal muscles contract, rib cage is elevated
D. Diaphragm relaxes, intercostal muscles relax, Rib cage is elevated

**Q.94 Respiratory distress syndrome is common in infants with a gestation age less than:**

A. 7 months
B. 8 months
C. 8.5 months
D. 9 months

**Q.95 Each 100 ml of blood takes up _____ ml of carbon dioxide as it passes through the tissues:**

A. 4 ml
B.20 ml
C. 50 ml
D. 54 ml

**Q.96 During increased muscular activity all of these happen except:**

A. More $CO_2$ is liberated
B. Temperature increases
C. More oxygen delivery to muscles
D. $HbO_2$ does not dissociate

**Q.97 Oxyhemoglobin is formed at:**

A. Lungs
B. Atrium
C. Liver
D. Bone marrow

**Q.98 Oxygen saturation of hemoglobin decreases sharply when partial pressure of oxygen becomes:**

A. 100 mmHg
B. 115 mmHg
C. More than 60 mmHg
D. Less than 60 mmHg

**Q.99 Which of the following is more in concentration in inspired air as compared to others?**

A. $CO_2$
B. $O_2$
C. $N_2$
D. CO

**Q.100 Normally when we are at rest or asleep, the exchange of gases is about:**

A. 0.5 litre
B. 1.5 litre
C. 3.5 litre
D. 5.0 litre

**Q.101 Exchange of gases between blood and alveolar air in lungs occurs by:**

A. Active transport
B. Simple diffusion
C. Osmosis
D. All A, B, C

**Q.102 Which of the following changes occur in alveoli of patients who suffer from emphysema?**

A. Volume of alveoli Increases, Surface area for exchange Increases
B. Volume of alveoli Increases, Surface area for exchange Decreases
C. Volume of alveoli Decreases, Surface area for exchange Increases
D. Volume of alveoli Decreases, Surface area for exchange Decreases

**Q.103 Physiological dead air space is increased in:**

A. Cancer
B. Tuberculosis
C. Asthma
D. Emphysema

**Q.104 Different compounds in tar of tobacco smoke are responsible for:**

A. Respiratory distress syndrome & asthma
B. Asthma & tuberculosis
C. Lung cancer & emphysema
D. Emphysema & asthma

**Q.105 It is the most serious disease of respiratory system:**

A. Pulmonary cancer
B. Tuberculosis
C. Asthma
D. Emphysema

**Q.106 Infectious disease of respiratory system which results in night sweats, cough and fever is:**

A. Asthma
B. Emphysema
C. Cancer
D. Pulmonary tuberculosis

**Q.107 It serves as an intermediate compound for the transfer of oxygen from hemoglobin to aerobic metabolic processes of the muscle cells:**

A. Albumin
B. Calcium
C. Creatine
D. Myoglobin

**Q.108 Which of following have same binding site on hemoglobin?**

A. Oxygen and carbon dioxide
B. Carbon monoxide and carbon dioxide
C. Oxygen and carbon monoxide
D. Oxygen and Nitrogen

**Q.109 Number of oxygen molecules transported by one molecule of haemoglobin is:**

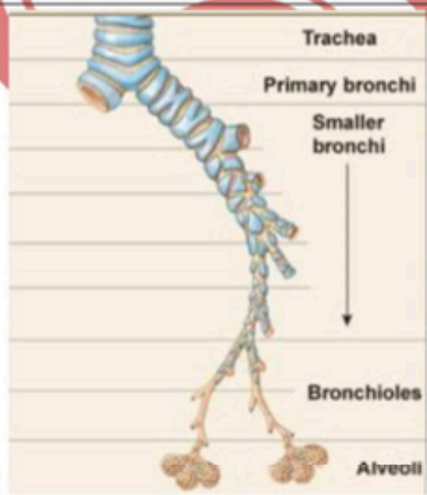
A. One
B. Two
C. Three
D. Four

**Q.110 Carnivorous plants live in soil that are deficient in:**

A. Water
B. Oxygen
C. Nitrogen
D. Iron

## ANSWERS & EXPLANTION: -

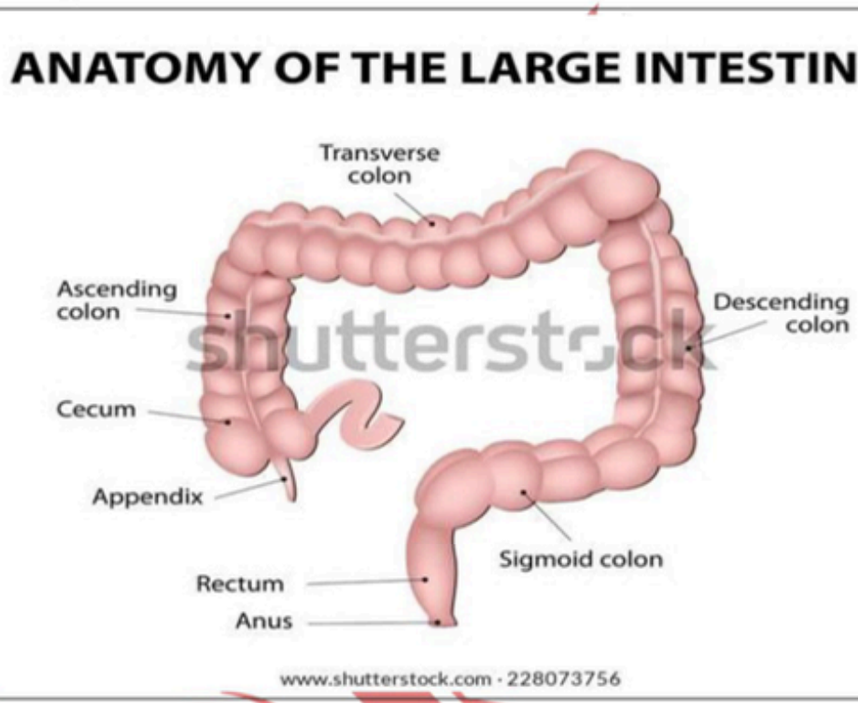
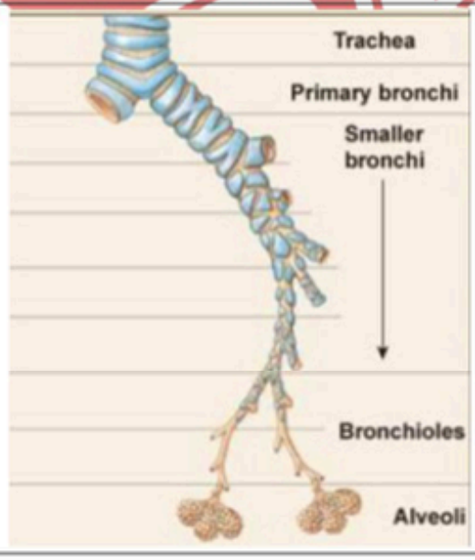
| | | |
|---|---|---|
| **Q.1** | **A** | All the insectivorous plants are true autotrophs. They are found in the nitrogen deficient soil. That is why they trap and digest insects to absorb nutrients. |
| **Q.2** | **B** | Insectivorous plants obtained their organic compounds by trapping and digesting insects and small animals. All of the insectivorous plants are true autotrophs, but when they capture prey, their growth becomes rapid. |
| **Q.3** | **A** | In plant mineral nutrition, elements can be classified as macro and micro depending upon their relative amount required in plants. |
| **Q.4** | **B** | Dead necrotic areas can be seen in plants due to the deficiency of K, P, Ca and Mg. |
| **Q.5** | **B** | Active transportation is required for minerals absorption from soil. |
| **Q.6** | **B** | Organisms that get their food from other organisms are called heterotrophic organism and mode of nutrition is termed as heterotrophic nutrition. |
| **Q.7** | **D** | Mycorrhizae is an association between roots of vascular plants and certain fungi in which both type of organisms get benefits. |
| **Q.8** | **B** | Insectivorous plants get nutrients by trapping insects to grow healthily. |
| **Q.9** | **A** | Sundew, Venous fly trap, and Pitcher plant are insectivorous plants while Dodder is parasitic plant. Insectivorous plants get their inorganic diet by trapping and digesting insects and small animals. Parasitic plants get their feeding by living in or on other organism of different species |
| **Q.10** | **A** | The end of leaf of Sarracenia purpurea is modified to form a hood, which partly covers the open mouth of the pitcher. Small insects that fall into the pitcher are prevented from climbing out by numerous stiff hairs. |
| **Q.11** | **A** | Water and mucus are involved in lubrication and convert it into slimy liquid form. |
| **Q.12** | **B** | Saliva has no role in selection and grinding of food.<br>Selection is done by senses while grinding is related with teeth. |
| **Q.13** | **B** | Tongue is specialized for taste and touch sensations. |
| **Q.14** | **D** | Bolus is small oval lump of softened food formed as a result of partial digestion of carbohydrates. |
| **Q.15** | **B** | • Sublingual glands are mucous glands that produce only mucus and no enzyme.<br>• Parotid glands are serous glands that produce water and enzyme but no mucous.<br>• Submaxillary glands are both mucous and serous glands and produce both mucous and enzymes. |
| **Q.16** | **C** | HCl kills germs present in food and thus acts as defense barrier of our body. |
| **Q.17** | **D** | • Bolus is produced as a result of chemical and mechanical digestion in oral cavity.<br>• Chyme is end result of digestion in stomach.<br>• Chyle is neutralized form of chyme produced in duodenum. |
| **Q.18** | **D** | Chief cells/ Zymogen cells secrete pepsin in form of pepsinogen. Pepsin hydrolyses proteins into polypeptides and peptones. |
| **Q.19** | **D** | • Sight, smell and taste stimulate through nervous system.<br>• Gastrin hormones stimulates gastric juice secretion.<br>• More protein food stimulates more gastric juice production. |
| **Q.20** | **A** | Cardiac sphincter is present between stomach and oesophagus. Thus, it prevents backward movement of food from stomach to oesophagus. |
| **Q.21** | **A** | • Both work in aqueous medium. |

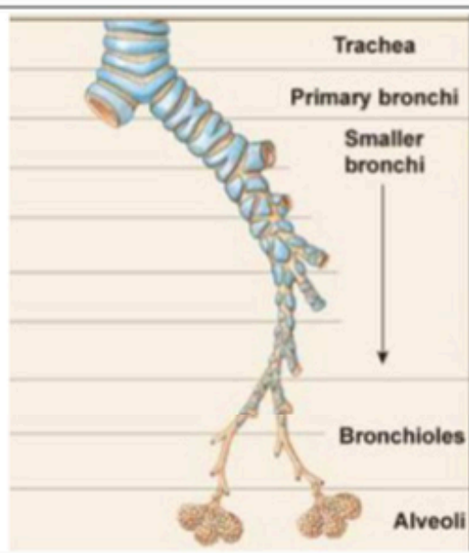
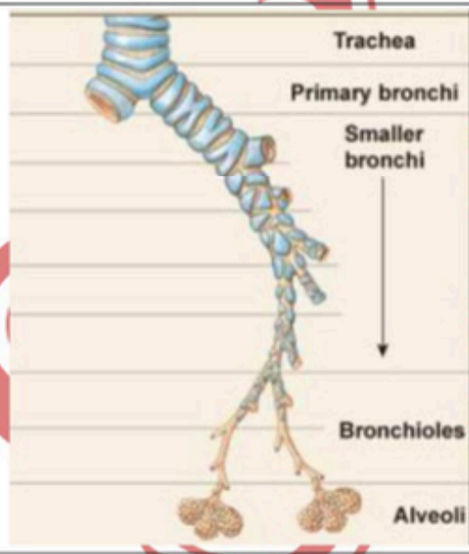
<table>
<tr><td></td><td></td><td>• Both digest proteins into polypeptides and peptones.<br>• Both work in alimentary canal.</td></tr>
<tr><td>Q.22</td><td>A</td><td>• Gall bladder is involved in storage and concentration of bile.<br>• Production of bile is function of liver.<br>• Gall bladder does not secrete enzymes.<br>• Formation of bile salts is function of liver.</td></tr>
<tr><td>Q.23</td><td>C</td><td><table><tr><th>ENZYMES</th><th>SUBSTRATES</th><th>PRODUCTS</th></tr><tr><td>Amino peptidase</td><td>Polypeptides</td><td>Dipeptides</td></tr></table></td></tr>
<tr><td>Q.24</td><td>D</td><td>• Ingestion is intake of food through buccal cavity.<br>• Digestion is breakdown into simple diffusible forms.<br>• Assimilation is utilization of digested products at cell level.</td></tr>
<tr><td>Q.25</td><td>B</td><td>This is possible due to conscious control of anal sphincter in adults.</td></tr>
<tr><td>Q.26</td><td>D</td><td>All other sphincters contain only smooth muscles.</td></tr>
<tr><td>Q.27</td><td>A</td><td>Food absorption occurs mainly at small intestine.</td></tr>
<tr><td>Q.28</td><td>C</td><td>Poisons in food reverse peristalsis and even lead to vomiting. This action is to prevent entry of toxins in blood.</td></tr>
<tr><td>Q.29</td><td>C</td><td>These fat drops accumulate in cytoplasm and occupy most of the space of cell.</td></tr>
<tr><td>Q.30</td><td>D</td><td>These are common storage site.</td></tr>
<tr><td>Q.31</td><td>C</td><td>Both hair and mucus are part of 1st line defense system in immunity and are physical barriers. Cilia are not included in physical barriers; they propel mucus.</td></tr>
<tr><td>Q.32</td><td>B</td><td>Voice is produced when air passes through vocal cords. Speech involves the coordination of parts of buccal cavity.</td></tr>
<tr><td>Q.33</td><td>B</td><td>Glottis is the opening of windpipe. When food is swallowed a ring of muscles contracts and tends to close it. The bolus is further prevented to enter into it by movement of epiglottis.</td></tr>
<tr><td>Q.34</td><td>D</td><td>Both hair and mucus are part of 1st line defense system in immunity and are physical barriers. Cilia are not included in physical barriers; they propel mucus.</td></tr>
<tr><td>Q.35</td><td>B</td><td> 

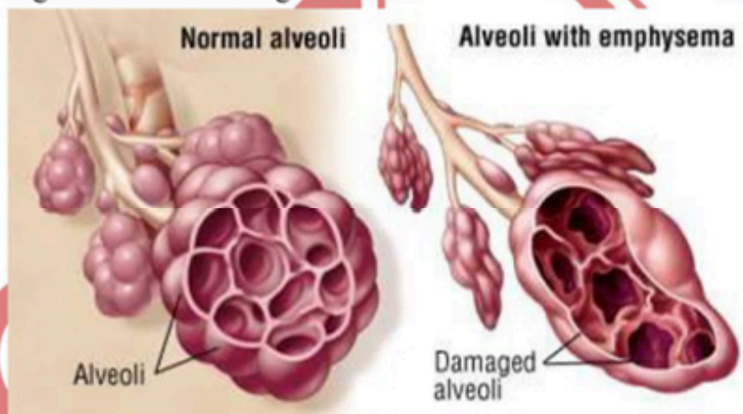
C shaped cartilaginous rings are present in trachea and bronchi. In bronchi the C shaped cartilage rings are gradually replaced by cartilaginous plates. Bronchioles totally lack cartilage and are composed of circular smooth muscles only.</td></tr>
<tr><td>Q.36</td><td>B</td><td>One breath in human normally takes 3-4 seconds to complete.</td></tr>
</table>

<table>
<tr><td>Q.37</td><td>D</td><td>
<table>
<tr><th>Gas</th><th>Inspired air (%)</th><th>Expired air (%)</th><th>Explanation</th></tr>
<tr><td>Nitrogen</td><td>79</td><td>79</td><td>- not used/produced by body processes</td></tr>
<tr><td>Oxygen</td><td>21</td><td>16</td><td>- used up in respiration</td></tr>
<tr><td>$CO_2$</td><td>0.04</td><td>4</td><td>- produced in respiration</td></tr>
<tr><td>Water vapour</td><td>Variable</td><td>Saturated</td><td>- produced by respiration<br>- moisture evaporates from surface of alveoli</td></tr>
</table>
</td></tr>
<tr><td>Q.38</td><td>B</td><td>Lungs are elastic and spongy in nature and their movement during inspiration and expiration is due to pressure difference.</td></tr>
<tr><td>Q.39</td><td>D</td><td>Regulator of normal breathing is medulla whereas rate and pattern of breathing is controlled by pons.</td></tr>
<tr><td>Q.40</td><td>C</td><td>• There is no change in floor of buccal cavity in humans during respiration.<br>• During inspiration, ribs move outward and upward.<br>• During inspiration, diaphragm becomes less dome shaped.</td></tr>
<tr><td>Q.41</td><td>B</td><td>Under normal conditions hemoglobin is not fully saturated. Instead of 20ml $O_2$/100ml of blood, 19.6ml $O_2$/100 ml of blood is carried.</td></tr>
<tr><td>Q.42</td><td>C</td><td>$CO_2$ is carried by protein part of hemoglobin where it binds to N terminal of its polypeptide chain.</td></tr>
<tr><td>Q.43</td><td>B</td><td>Maximum amount of carbon dioxide is transported in the form of sodium bicarbonate in plasma.</td></tr>
<tr><td>Q.44</td><td>B</td><td>The dissociation of oxyhemoglobin is favored by increase in $H^+$ ion concentration, increase in temperature and carbon dioxide concentration and vice versa.</td></tr>
<tr><td>Q.45</td><td>D</td><td>The concentration of nitrogen in inhaled and exhaled air is same because it is neither exchanged nor transported.</td></tr>
<tr><td>Q.46</td><td>A</td><td>Plasma proteins and hemoglobin collectively transport 25% of carbon dioxide.</td></tr>
<tr><td>Q.47</td><td>A</td><td>Shock is a life-threatening condition that occurs when the body is not getting enough blood flow. Lack of blood flow means the cells and organs do not get enough oxygen and nutrients to function properly.</td></tr>
<tr><td>Q.48</td><td>B</td><td>Oxyhaemoglobin is bright red in colour.</td></tr>
<tr><td>Q.49</td><td>B</td><td>Solubility of carbon dioxide is maximum as compared to others. Nitrogen does not enter in blood. While oxygen and carbon monoxide are transported through haemoglobin.</td></tr>
<tr><td>Q.50</td><td>B</td><td>When hemoglobin is 100% saturated, 100 ml of blood contains 20ml of oxygen.</td></tr>
<tr><td>Q.51</td><td>C</td><td>Air which is breathed in and out at rest is tidal volume. Air that remains inside the lungs after a forceful expulsion is called as residual volume.</td></tr>
<tr><td>Q.52</td><td>C</td><td>Maximum air that can be breathed in and out is 3.5 L.<br>• Tidal volume at rest is 500 ml.<br>• Maximum lung capacity is 5 L.<br>• Residual volume is 1.5 L</td></tr>
<tr><td>Q.53</td><td>D</td><td>An infant with gestation age of less than 7 months will have insufficient surfactant which will cause RDS.</td></tr>
<tr><td>Q.54</td><td>D</td><td>• Tidal volume at rest is 500 ml.<br>• Maximum lung capacity is 5 L.</td></tr>
</table>

| | | |
|---|---|---|
| | | • Residual volume is 1.5 L<br>• Maximum air that can be breathed in and out is 3.5 L |
| **Q.55** | **B** | Infectious diseases are mostly contagious because they are caused by bacteria or viruses. |
| **Q.56** | **D** | Tumors are of two types; benign and malignant. Malignant tumors with unlimited growth are also called cancer. |
| **Q.57** | **C** | Carcinoma is the cancer of epithelial cells. Asthma is an allergic disorder in which bronchioles are constricted. In emphysema breakdown of alveoli occurs. Smaller alveoli join to form larger alveoli which increases the physiological dead space. T.B is a contagious disease which causes the blockage of respiratory passage ways. |
| **Q.58** | **D** | Myoglobin is also called as muscle hemoglobin. |
| **Q.59** | **C** | Without hemoglobin the amount of oxygen carried by blood will be 0.27 ml/100 ml of blood, whereas maximum amount of oxygen that hemoglobin can bind and transport is 20 ml/100 ml of blood. |
| **Q.60** | **B** | Hemoglobin will be present in those cells which are involved in the transport of oxygen. |
| **Q.61** | **A** | The two important modes of nutrition include: Autotrophic nutrition: In this type of nutrition, the plants and other photosynthetic organisms prepare their own food with the help of sunlight, water and carbon dioxide. Heterotrophic nutrition: The animals cannot prepare their own food. |
| **Q.62** | **A** | **Gland** — **Opening of Ducts**<br>Parotid glands — Posterior part of oral cavity<br>Submandibular glands — Floor of oral cavity<br>Sublingual glands — Floor of oral cavity |
| **Q.63** | **C** | Teeth have role in mastication which is mechanical digestion. Out of all teeth, molar teeth are specialized for grinding. |
| **Q.64** | **C** | Swallowing starts with voluntary act of tongue. |
| **Q.65** | **C** | A) Tongue moves ***upward and backward.***<br>B) Epiglottis becomes ***more or less horizontal.***<br>D) Larynx moves ***upward.*** |
| **Q.66** | **C** | During swallowing, soft palate moves upward and closes nasal cavities. |
| **Q.67** | **A** | Buccal glands are found on tongue. |
| **Q.68** | **D** | Larynx and trachea move upward. |
| **Q.69** | **A** | Submaxillary and submandibular are same. Submaxillary and sublingual pour their secretions on floor of buccal cavity. |
| **Q.70** | **D** | Stomach has both endocrine (ductless) and exocrine parts (ducted). Its exocrine or ducted part secretes gastric juice (mucus, water, HCl, pepsinogen) while endocrine or ductless part secretes gastrin. |
| **Q.71** | **C** | Amount of gastric juice secreted depends upon protein contents of food. Meat contains more proteins as compared to others. |
| **Q.72** | **D** | Concentrated HCl and pepsin can cause damage if walls are not protected by mucous. |
| **Q.73** | **B** | Gastrin is a hormone secreted from G cells found in mucosa of pyloric end of stomach. |
| **Q.74** | **D** | Bile and pancreatic juice are carried by ducts to duodenum. Lacrimal glands are tear glands. |
| **Q.75** | **C** | Bile pigments commonly bilirubin enters in blood and causes jaundice |
| **Q.76** | **C** | Goblet cells are mucous cells of intestine and trachea having globular shape. |
| **Q.77** | **D** | • Saliva contains enzymes only for carbohydrates. |

| | | |
|---|---|---|
| | | • Bile is involved in digestion/ emulsification of only fats.<br>• Gastric juice contains enzymes for protein digestion only.<br>• Pancreatic juice contains enzymes for protein digestion. |
| **Q.78** | **A** | **ENZYMES** / **SUBSTRATES** / **PRODUCTS**<br>Maltase / Maltose / Glucose<br>Lactase / Lactose / Glucose + Galactose<br>Sucrase / Sucrose / Glucose + Fructose |
| **Q.79** | **B** | Epithelial cells after absorption convert them back to lipid and release into lumen through exocytosis. |
| **Q.80** | **C** | These lipoproteins/ chylomicrons are formed in epithelial cells of villus (enterocytes). |
| **Q.81** | **A** | These symbiotic bacteria are E.coli. |
| **Q.82** | **C** |  |
| **Q.83** | **B** | 1. Caecum, 2. Colon. 3. Rectum |
| **Q.84** | **D** | Vitamin K is lipid soluble |
| **Q.85** | **C** |  Bronchi when attain diameter of 1mm or less are called bronchioles and they totally lack cartilage. |

| | | |
|---|---|---|
| **Q.86** | **A** |  Air passage ways consist of nostrils, nasal cavities, pharynx, larynx, trachea, bronchi, bronchioles and alveolar ducts. |
| **Q.87** | **B** | The largest organ of human body with respect to functions is liver and with respect to surface area is skin. |
| **Q.88** | **D** | Pleura is a double membranous layer around the lungs. The pleural fluid present inside it prevents the leakage and lubricates the lungs. |
| **Q.89** | **B** | Air passage ways consist of nostrils, nasal cavities, pharynx, larynx, trachea, bronchi, bronchioles and alveolar ducts. |
| **Q.90** | **C** | Cartilage is part of skeletal system and its function is to provide support. |
| **Q.91** | **B** |  • Trachea contains C shaped cartilage rings.<br>• Larynx is cartilaginous box like structure.<br>• Bronchi contain cartilage plates. |
| **Q.92** | **D** | Expiration involves relaxation of diaphragm and intercostal muscles which causes a decrease in volume of chest cavity. |
| **Q.93** | **C** | Air moves in the respiratory tract when its volume is increased by movement of diaphragm and intercostal muscles. |
| **Q.94** | **A** | Respiratory distress syndrome is due to lack of surfactant. Surfactant formation is completed in 28th week of gestation period. |
| **Q.95** | **A** | Arterial blood has 50ml $CO_2$/ 100 ml of blood whereas venous blood has 54ml $CO_2$/ 100 ml of blood. |
| **Q.96** | **D** | When muscular activity is increased more ATP is utilized hence there is more need of oxygen in order to provide more ATP by aerobic respiration. |
| **Q.97** | **A** | Oxyhemoglobin is formed when oxygen combines with hemoglobin at a suitable partial pressure. |
| **Q.98** | **D** | Maximum binding of hemoglobin with oxygen takes place at partial pressure of 100-115 mmHg. However at the level of tissues a low partial pressure favors the dissociation. |

<table>
<tr><td>Q.99</td><td>C</td><td>
<table>
<tr><th>Gas</th><th>Inspired air (%)</th><th>Expired air (%)</th><th>Explanation</th></tr>
<tr><td>Nitrogen</td><td>79</td><td>79</td><td>- not used/produced by body processes</td></tr>
<tr><td>Oxygen</td><td>21</td><td>16</td><td>- used up in respiration</td></tr>
<tr><td>$CO_2$</td><td>0.04</td><td>4</td><td>- produced in respiration</td></tr>
<tr><td>Water vapour</td><td>Variable</td><td>Saturated</td><td>- produced by respiration<br>- moisture evaporates from surface of alveoli</td></tr>
</table>
</td></tr>
<tr><td>Q.100</td><td>A</td><td>• Tidal volume at rest is 500 ml.<br>• Maximum lung capacity is 5 L.<br>• Residual volume is 1.5 L<br>• Maximum air that can be breathed in and out is 3.5 L</td></tr>
<tr><td>Q.101</td><td>B</td><td>Gaseous exchange in all living organisms always occurs through simple diffusion.</td></tr>
<tr><td>Q.102</td><td>B</td><td>In emphysema breakdown of alveoli occurs. Smaller alveoli join to form larger alveoli which increases the physiological dead space.</td></tr>
<tr><td>Q.103</td><td>D</td><td>Physiological dead space increases when alveolar breakdown causes smaller alveoli to join together and form larger alveoli.<br> 
</td></tr>
<tr><td>Q.104</td><td>C</td><td>Smoking is main cause of lung cancer and emphysema. T.B is infectious while asthma is allergic disorder. RDS occurs in premature infants due to lack of surfactant.</td></tr>
<tr><td>Q.105</td><td>A</td><td>Cure and survival rate is more in T.B, asthma and emphysema than it is in Lung cancer.</td></tr>
<tr><td>Q.106</td><td>D</td><td>Pulmonary tuberculosis causes lung damage resulting in cough and fever. Mycobacterium tuberculosis is the causative agent.</td></tr>
<tr><td>Q.107</td><td>D</td><td>Oxygen in human blood is transported by hemoglobin. In muscles oxygen is stored and transferred by myoglobin.</td></tr>
<tr><td>Q.108</td><td>C</td><td>Carbon dioxide binds with protein part of hemoglobin whereas oxygen and carbon monoxide bind with haeme group of hemoglobin.</td></tr>
<tr><td>Q.109</td><td>D</td><td>Oxygen binds with $Fe^{2+}$ in heme portion of hemoglobin. A molecule of hemoglobin has 4 heme groups.</td></tr>
<tr><td>Q.110</td><td>C</td><td>Carnivorous plants have adapted to grow in places where the soil is thin or poor in nutrients, especially nitrogen.</td></tr>
</table>

# TRANSPORT

## Transport in Plant

**Q.1 Which essential nutrient in plant is required in greatest amount?**

A. Nitrogen
B. Phosphorous
C. Potassium
D. Calcium

**Q.2 Deplasmolysis occurs in a cell when it is placed in**

A. Hypotonic solution
B. Hypertonic solution
C. Isotonic solution
D. Buffer solution

**Q.3 The pressure exerted by the protoplast due to the entry of water against the rigid cell wall is called**

A. Osmotic potential
B. Pressure potential
C. Water potential
D. Matrix potential

**Q.4 Effect of root pressure is visible**

A. At night
B. At early morning
C. When evaporation is low
D. All A, B, C

**Q.5 A column of water within xylem vessels of tall trees does not break under its weight because of:**

A. Tensile strength of water
B. Lignification of xylem vessels
C. Positive root pressure
D. Dissolved sugars in water

**Q.6 The hormone which reduces the rate of transpiration by stopping K+ influx into the guard cells:**

A. Auxins
B. Cytokinins
C. Gibberellins
D. Abscisic acid

**Q.7 In terms of permeability, the cell wall and plasmalemma are:**

A. Permeable and differentially permeable
B. Both semipermeable
C. Semipermeable and differentially permeable
D. Both are differentially permeable

**Q.8 Which of the following process/ processes is/are involved in the uptake of mineral by the root hairs from soil?**

A. Diffusion
B. Facilitated diffusion
C. Active transport
D. All A, B, C

**Q.9 It is the most widely accepted theory of carbohydrate translocation:**

A. Root pressure theory
B. Mass flow theory
C. Imbibition theory
D. Osmotic theory

**Q.10 When sugar is added to the source water potential of sucrose _____ and when sugar is removed from sink, the water potential of sink _____.**

A. Increases, increases
B. Increases, decreases
C. Decreases, decreases
D. Decreases, increases

## Structure of Human Heart

**Q.11 Branches that arise from arch of aorta supply blood to all of the following except:**

A. Head
B. Arms
C. Shoulders
D. Heart

**Q.12 The flaps of tricuspid valves are attached to the muscular extensions of right ventricle known as:**

A. Smooth muscles
B. Papillary muscles
C. Inter coastal muscle
D. Skeletal muscles

**Q.13 Flaps of inlet valves in heart are directly connected to:**

A. Papillary muscles
B. Ventricular muscles
C. Chordae tendinae
D. Atrial muscles

**Q.14 QRS complex in ECG is produced:**

A. During ventricular diastole
B. Prior to ventricular systole
C. Prior to ventricular diastole
D. During ventricular systole

**Q.15 Pacemaker is located at:**

A. Apex of ventricles
B. Upper right side of atrium
C. Upper left side of atrium
D. Base of aorta

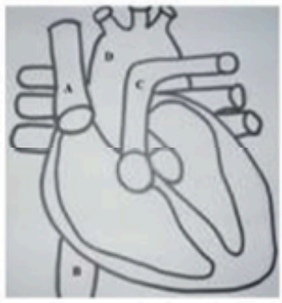
**Q.16 The heart beat is initiated by:**

A. Atrio-ventricular node
B. Bundle of His
C. Medulla oblongata
D. Sino-atrial node

**Q.17 Role of a pacemaker is to:**

A. Initiate heart beat
B. Increase heart beat
C. Decrease heart beat
D. Control blood supply to hear

**Q.18 The diagram shows human heart:**



A. A
B. B
C. C
D. D

**Q.19 In ECG pattern, P-wave is formed under the control of:**

A. S-A node
B. A-V node
C. Myocardium
D. Pericardium

**Q.20 T wave appears before:**

A. Atrial contraction
B. Atrial relaxation
C. Ventricular contraction
D. Ventricular relaxation

**Q.21 Highest blood pressure is found in:**

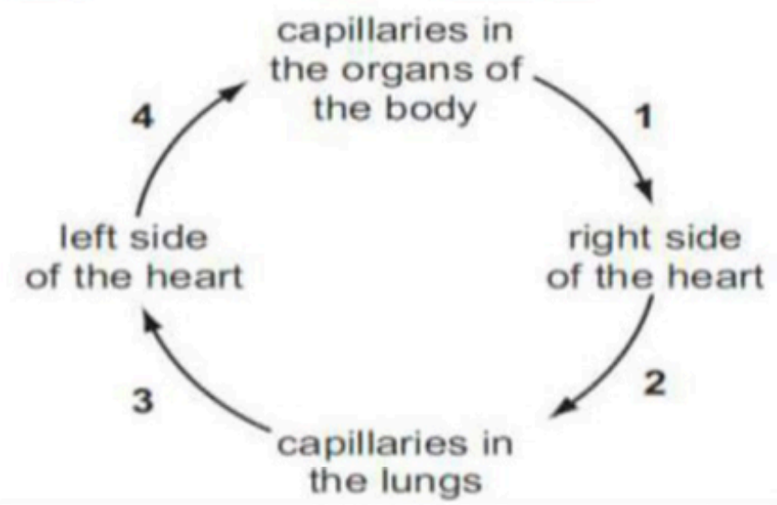
A. Aorta
B. Pulmonary artery
C. Superior vena cava
D. Inferior vena cava

## Blood Vessels

**Q.22 Which of the following is common in all blood vessels?**

A. Elastic fibers
B. Connective tissues
C. Endothelium
D. Smooth muscles

**Q.23 The diagram represents blood flow through the human body. At which stages does the blood contain the most oxygen?**




A. 1 and 2
B. 3 and 4
C. 2 and 3
D. 4 and 1

**Q.24 Oxygenated blood to the respiratory passages is supplied by:**

A. Pulmonary vein
B. Pulmonary artery
C. Brachiocephalic artery
D. Bronchial artery

**Q.25 Main difference between walls of arteries and veins lies in:**

A. Tunica externa
B. Tunica media
C. Tunica interna
D. All A, B, C

**Q.26 Capillaries have:**

A. Circular smooth muscle
B. Elastic membrane
C. Endothelial cells
D. All of these

**Q.27 Diameter of capillaries can be adjusted through all means except:**

A. Histamine
B. Nervous stimulation
C. Smooth muscles contraction
D. Changing shape of cells

**Q.28 Smaller bore and thicker wall is character of:**

A. Arteries
B. Veins
C. Capillaries
D. Vena cava

**Q.29 First pair of arteries that arise from aorta are:**

A. Pulmonary arteries
B. Coronary arteries
C. Subclavian arteries
D. Bronchial arteries

**Q.30 Coronary arteries arise from:**

A. Base of aorta
B. Arch of aorta
C. Thoracic aorta
D. Abdominal aorta

## Blood circulatory system (Blood)

**Q.31 Most of the plasma proteins are synthesized in:**

A. Liver
B. Kidneys
C. Bone marrow
D. Thymus

**Q.32 Percentage of blood cells among whole blood is _____ % by volume.**

A. 55
B. 90
C. 45
D. 7-9

**Q.33 Serum, as compared with plasma does not contain:**

A. Immunoglobulins
B. Clotting protein
C. Albumin
D. Inorganic salts

**Q.34 Most abundant component of plasma is:**

A. Albumin
B. Antibodies
C. Water
D. Glucose

**Q.35 These have the longest life span:**

A. Erythrocytes
B. Lymphocytes
C. Neutrophils
D. Basophils

**Q.36 Polymorphonuclear blood cells are:**

A. Erythrocytes
B. Granulocytes
C. Agranulocytes
D. Thrombocytes

**Q.37 Which is incorrect about platelets?**

A. Lack nucleus
B. Help prevent bleeding
C. Lack pigments
D. Are called "true cells"

**Q.38 Neutrophils, eosinophils and basophils are included in:**

A. Phagocytes
B. Agranulocytes
C. Granulocytes
D. Thrombocytes

**Q.39 In fungal infections, these are most likely to be increased:**

A. Neutrophils
B. Eosinophils
C. Basophils
D. Lymphocyte

**Q.40 Most abundant inorganic mineral in blood plasma is:**

A. Water
B. Sodium chloride
C. Thrombin
D. Cholesterol

## Lymphatic system

**Q.41 Just as the lymph nodes filter lymph, _____ filters blood:**

A. Liver
B. Kidneys
C. Lungs
D. Spleen

**Q.42 Interstitial fluid contains all of the following except:**

A. Proteins
B. Water
C. Red blood cells
D. White blood cells

**Q.43 Lymph nodes are not present in:**

A. Brain
B. Intestine
C. Neck
D. Thoracic region

**Q.44 Lacteals are the branches of lymph capillaries within:**

A. Lymph nodes
B. Villi
C. Bone marrow
D. Microvilli

**Q.45 Spleen filters blood by exposing it to all except:**

A. T lymphocytes
B. B lymphocytes
C. Macrophages
D. Eosinophils

**Q.46 In digestive tract, lymphoid masses are present in:**

A. Mucosa
B. Sub-mocusa
C. Serosa
D. Both A and B

**Q.47 Thoracic duct of lymphatic system mainly drains into:**

A. Left subclavian vein
B. Right subclavian vein
C. Left subclavian artery
D. Right subclavian artery

**Q.48 The flow of lymph is maintained by:**

A. Skeletal muscles
B. Smooth muscles
C. Semilunar valves
D. All of these

**Q.49 All of the following are larger lymphoid masses except:**

A. Liver
B. Spleen
C. Thymus
D. Adenoids

**Q.50 The correct pathway of passage of lymph is:**

A. Interstitial fluid → lymph vessel → lymph capillaries → lymph node
B. Interstitial fluid → lymph node → lymph vessel → lymph capillaries
C. Interstitial fluid → lymph capillaries → lymph node → lymph vessels
D. Interstitial fluid → lymph vessel → lymph node → lymph capillaries

## Immune system

**Q.51 In an antibody molecule, both heavy and light chains are:**

A. Similar
B. Identical
C. Dissimilar
D. Constant

**Q.52 Antibodies are manufactured in:**

A. Thymus
B. Bone marrow
C. T lymphocytes
D. B lymphocytes

**Q.53 Neutrophils and macrophages form:**

A. 1st defense line
B. 2nd defense line
C. 3rd defense line
D. 4th defense line

**Q.54 One that is destroyed by HIV:**

A. T-helper cell
B. T-memory cell
C. T-killer cell
D. B-memory cell

**Q.55 The capacity of body to recognize entry of foreign material and preparation against is:**

A. Infection
B. Regeneration
C. Infestation
D. Immunity

**Q.56 Antibodies are involved in:**

A. Destruction of antigen
B. Speed up phagocytosis
C. Neutralize toxins
D. All A, B, C

**Q.57 A person gets vaccinated for tetanus; this vaccine will produce which type of immunity?**

A. Natural active immunity
B. Natural passive immunity
C. Artificial active immunity
D. Artificial passive immunity

**Q.58 It can provide natural passive immunity:**

A. Vaccine
B. Antiserum
C. Colostrum
D. Antigen

**Q.59 Transfer of antibodies from maternal blood to foetal blood is an example of:**

A. Artificial active immunity
B. Natural active immunity
C. Natural passive immunity
D. Artificial passive immunity

**Q.60 Globulins play important role in:**

A. Blood clotting
B. Transport
C. Immunity
D. Osmotic balance

**Q.61 Major constituent of human blood by volume is:**

A. Plasma
B. Blood cells
C. Serum
D. Anti-serum

**Q.62 Platelets are derived from:**

A. Stem cells
B. Neutrophils
C. Megakaryocytes
D. Monocytes

**Q.63 They can destroy large particles by engulfing them:**

A. Monocytes
B. Macrophages
C. Eosinophils
D. Neutrophils

**Q.64 Colloid osmotic pressure is provided by which component of blood?**

A. Plasma minerals
B. Plasma proteins
C. Water
D. Blood cells

**Q.65 A person is weighing 60 kg. Approximate weight of his blood will be:**

A. 1 kg
B. 5 kg
C. 4 kg
D. 10 kg

**Q.66 Which of the following is not a common function of blood and lymph?**

A. Transportation of nutrients
B. Transportation of antibodies
C. Transportation of gases
D. Transportation of proteins

**Q.67 Cardiac muscles differ from skeletal muscles in their:**

A. Control
B. Structure
C. Function
D. All of these

**Q.68 It generates more powerful contractions during pumping:**

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

**Q.69 Right heart in humans receives:**

A. Oxygenated blood from venae cava
B. Deoxygenated blood from venae cava
C. Oxygenated blood from pulmonary veins
D. Deoxygenated blood from pulmonary veins

**Q.70 Correct passage of impulses for heart excitation is:**

A. SA node → Musculature of atria → AV node → Interventricular septum → Myocardium of ventricles
B. SA node → AV node → Musculature of atria → Interventricular septum → Myocardium of ventricles
C. SA node → Interventricular septum → AV node → Musculature of atria + Myocardium of ventricles
D. SA node → Musculature of atria + AV node → Interventricular septum → Myocardium of ventricles

**Q.71 One complete heart beat consists of one systole and one diastole and lasts for:**

A. 0.2 sec
B. 0.5 sec
C. 0.6 sec
D. 0.8 sec

**Q.72 Dubb sound by heart is made due to:**

A. Closing of AV valves
B. Opening of AV valves
C. Closing of semilunar valves
D. Opening of semilunar valves

**Q.73 In humans, inferior vena cava at the level of lower abdomen is formed by the combination of:**

A. Femoral veins
B. Iliac veins
C. Renal veins
D. Mesenteric veins

**Q.74 In Atherosclerosis, which layer of artery is thickened?**

A. Internal endothelial
B. External connective
C. Middle layer
D. Connective tissue layer

**Q.75 Atherosclerosis is the hardening and thickening of:**

A. Innermost layer of artery
B. Middle layer of artery
C. Innermost layer of vein
D. Middle layer of vein

**Q.76 The contraction of muscle of arteries and veins are under control of:**

A. Nervous system only
B. Endocrine system only
C. Both nervous & endocrine systems
D. Local control

**Q.77 Velocity of blood flow is least in capillaries due to their:**

A. Lowest blood pressure
B. Largest cross-sectional area
C. One wall thickness
D. Valvular nature

**Q.78 Lymph vessels empty in:**

A. Arteries
B. Veins
C. Portal arteries
D. Portal veins

**Q.79 Lymph capillaries join to form larger and larger lymph vessels and ultimately form:**

A. Thoracic duct
B. Subclavian vein
C. Lymph node
D. Lymphoid mass

**Q.80 Pick an odd pair with respect to location of lymph nodes:**

A. Arm- Axillary nodes
B. Thigh- Groin
C. Throat- Tonsils
D. Brain-Ventricles

**Q.81 The flow of lymph is always towards:**

A. Head
B. Chest
C. Abdomen
D. Liver

**Q.82 Lymph capillaries are different from blood capillaries in having all except:**

A. Blind ends
B. Pressure less than interstitial pressure
C. Large intercellular spaces
D. Red blood cells

**Q.83 Disulphide bridges are found between:**

A. Constant region of heavy chain and variable region of light chain
B. Variable region of heavy chain and constant region of light chain
C. Variable region of heavy chain and variable region of light chain
D. Constant region of heavy chain and constant region of light chain

**Q.84 Immunity has capacity to:**

A. Recognize intrusion of foreign particles into body
B. Mobilize cells and cell products against foreign particle
C. Remove foreign particle from body
D. All A, B, C

**Q.85 All of the following protect the body against germs except:**

A. HCl
B. Mucous membranes
C. Red blood cells
D. Skin

**Q.86 Allergic reactions develop in response to:**

A. Adrenaline
B. Heparin
C. Serotonin
D. Histamine

**Q.87 When a person is exposed to an infection and after illness develops immunity, this is called:**

A. Artificially induced active immunity
B. Naturally induced active immunity
C. Artificially induced passive immunity
D. Naturally induced passive immunity

**Q.88 Vaccination is done against all of these diseases except:**

A. Chicken pox
B. Migraine
C. Influenza
D. Polio

**Q.89 Water moves across a selectively permeable membrane:**

| | From | To |
|---|---|---|
| A. | Region of higher water potential | Region of lower water potential |
| B. | Lower water concentration | Higher water concentration |
| C. | Higher solute concentration | Lower solute concentration |
| D. | Region of higher osmotic potential | Regional of lower osmotic potential |

**Q.90 Root pressure develops due to**

A. Passive absorption of ions
B. Active absorption of ions
C. Active absorption of glucose
D. Passive absorption of sucrose

**Q.91 How much percentage of water is used for photosynthesis?**

A. 1%
B. 2%
C. 3%
D. 4%

**Q.92 Dry seeds when placed in water swells due to:**

A. Imbibitions
B. Absorption
C. Diffusion
D. Adsorption

**Q.93 Water, mineral and food are generally moved by over large distance by**

A. Simple diffusion
B. Facilitated diffusion
C. Active transport
D. Bulk flow or mass flow

**Q.94 Root pressure develops due to:**

A. Low osmotic potential in soil
B. Passive absorption
C. Increase in transpiration
D. Active absorption

**Q.95 The tendency of dissimilar particles or surfaces to cling to one another is called:**

A. Tension
B. Cohesion
C. Climbing
D. Adhesion

**Q.96 Transport of sugar from mesophyll cells to phloem tissue occur by all except:**

A. Simple diffusion
B. Active transport
C. Carrier mediated transport
D. Osmosis

**Q.97 Increase in the following causes, increase in rate of transpiration except:**

A. Light intensity
B. Humidity
C. Temperature
D. Wind

**Q.98 It separates extracellular space in root into two compartments:**

A. Cortex
B. Plasmodesmata
C. Pericycle
D. Casparian strips

**Q.99 Wilting appears due to excessive:**

A. Respiration
B. Transpiration
C. Absorption
D. Photosynthesis

**Q.100 It is found among water molecules by which water can move up the xylem like an unbroken column:**

A. Covalent bonds
B. Ionic bonds
C. H-bonds
D. Ester bonds

**Q.101 It is the main factor that is involved in uptake of water to aerial parts of plants:**

A. Cohesion
B. Transpiration pull
C. Imbibition
D. Root pressure.

**Q.102 Water will be absorbed by root hairs when:**

A. Concentration of salts in soil is high
B. Concentration of solutes in the cell sap is high
C. Plant is rapidly transpiring
D. They are separated from soil by semi-permeable membrane

**Q.103 The root hair absorbs water from the soil, when water potential of root cell is _____ than the soil.**

A. More
B. Equal
C. Lesser
D. More or less

**Q.104 Casparian strips are found in:**

A. Epidermal cells
B. Cortex
C. Pericyle
D. Endodermis

**Q.105 Which one of the following structures between two adjacent cells is an effective transport pathway?**

A. Plasmodesmata
B. Plastoquinone
C. Endoplasmic reticulum
D. Plasmalemma

**Q.106 Guard cells are surrounded by:**

A. Epidermal hairs
B. Mesophyll cells
C. Palisade cells
D. Subsidiary cells

**Q.107 Which of the following is called 'necessary evil'?**

A. Osmosis
B. Absorption
C. Transpiration
D. Photosynthesis

**Q.108 In plants, which sugar is transported from source to sink through sieve tubes?**

A. Fructose
B. Sucrose
C. Glucose
D. Starch

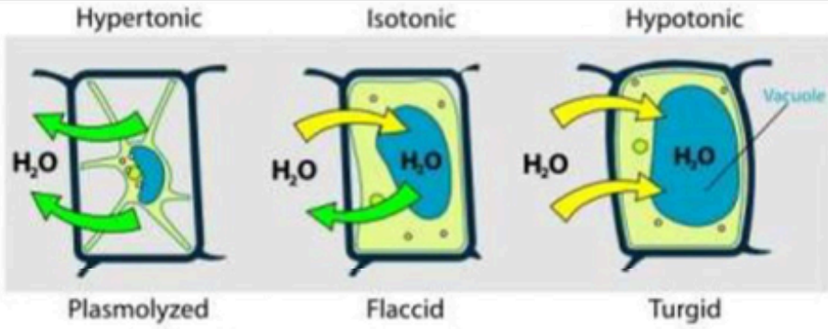
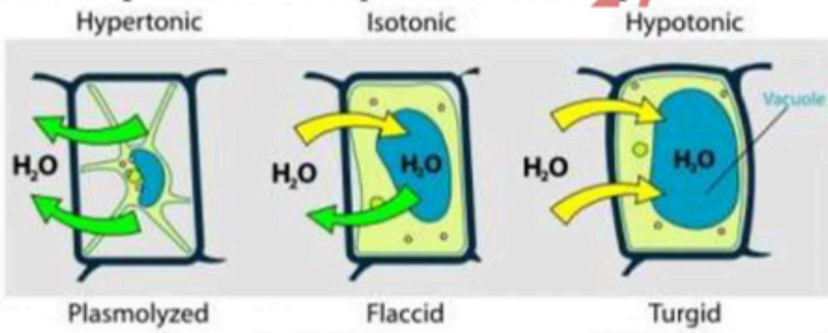
**Q.109 All are present in phloem tissue except:**

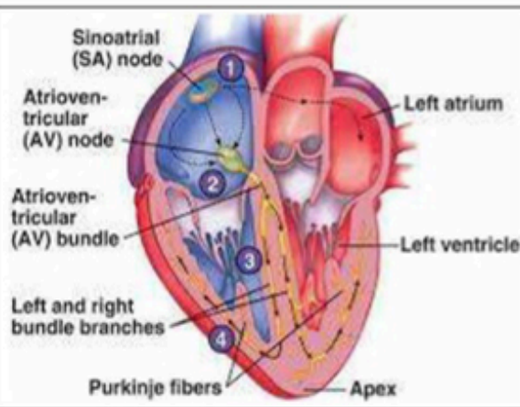
A. Sclereids
B. Parenchyma cells
C. Companion cells
D. Vessels

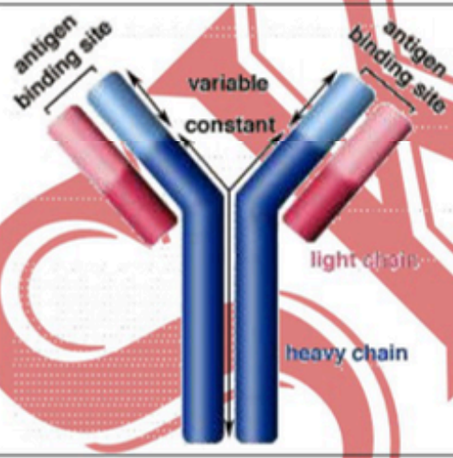
**Q.110 It is the most widely accepted theory that explain the transport of sugars in the phloem:**

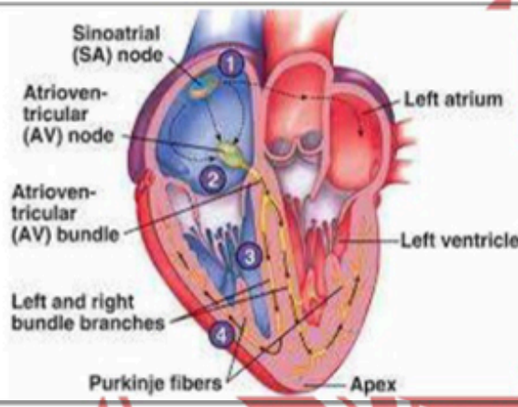
A. Starch sugar theory
B. $K^+$ influx theory
C. Pressure flow theory
D. Transpiration pull theory

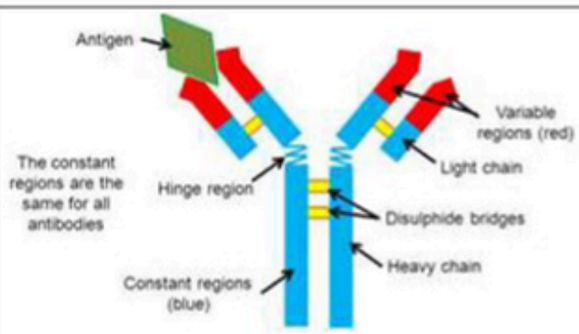
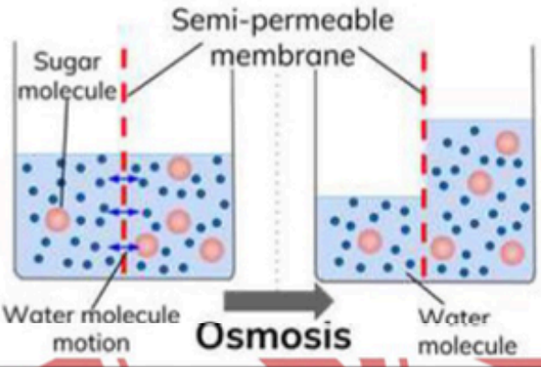
## ANSWERS & EXPLANTION: -

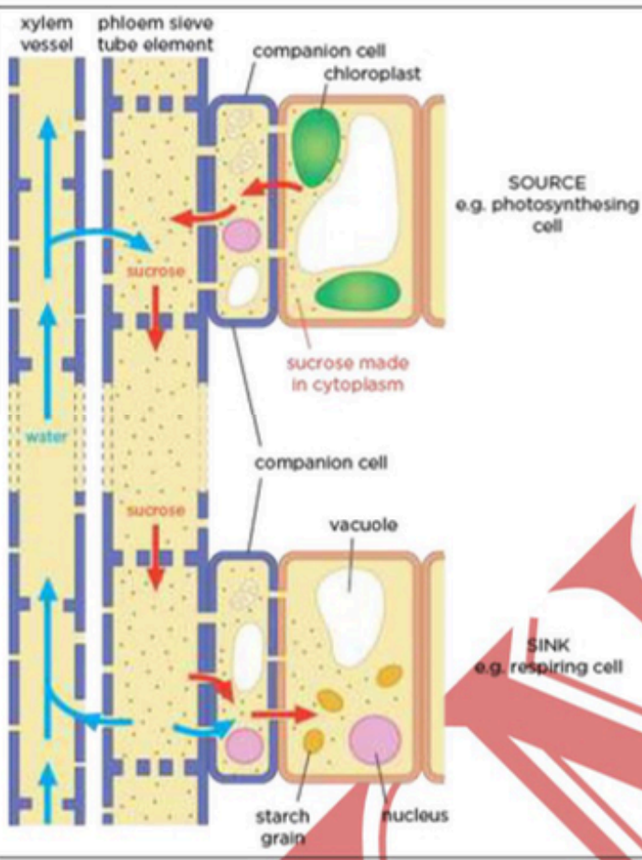
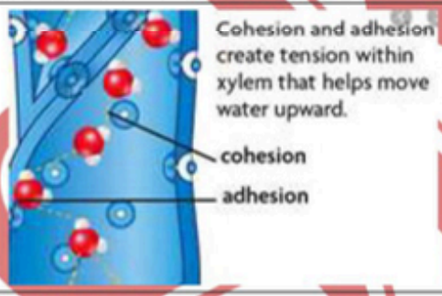
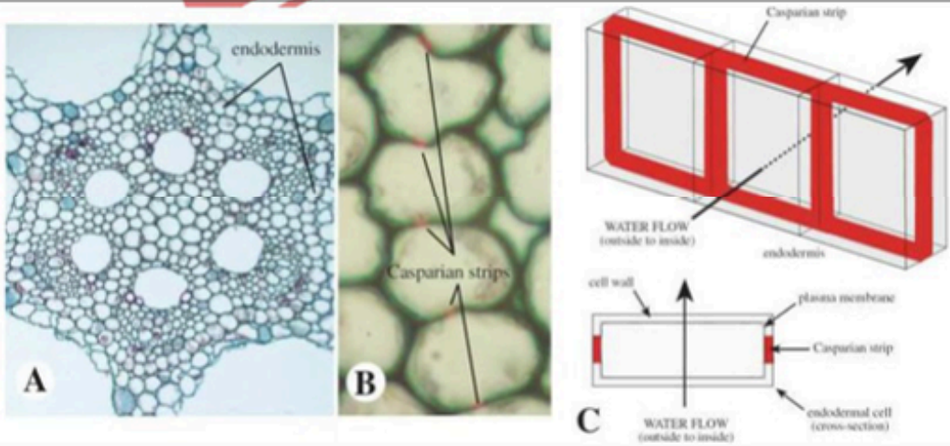
| | | |
|---|---|---|
| **Q.1** | **A** | As protein is most abundant organic compound in the cell. To make protein, nitrogen is most essential element. So nitrogen is most abundant than other elements in options. |
| **Q.2** | **A** |  |
| **Q.3** | **B** | **Pressure potential** = Water potential + Osmotic potential<br>  |
| **Q.4** | **D** | The root pressure is least effective during the day because transpiration pull is the active force involved in pulling the sap in xylem cells upwards. At night transpiration is not prominent due to the closure of stomata. Guttation or exudation is more notable at night due to root pressure. |
| **Q.5** | **A** | Xylem walls have high tensile strength. The lignin and cellulose provide strength to cell wall of xylem vessels. By cohesion-tension of water molecules, and the transpiration pull providing the necessary energy, the sap (water and minerals) in xylem tissue is pulled upwards to the leaves. |
| **Q.6** | **D** | Abscisic acid stops the active transport of K+ into guard cells, overriding the effect of light and CO2 concentration. So K+ pumping stops. Stomata close. |
| **Q.7** | **A** | Plasma membranes are semi-permeable and have receptors which help in cell-cell communication, whereas cell wall is completely permeable and does not have any receptors. |
| **Q.8** | **D** | The uptake of minerals by the root hair cells is a combination of passive and active uptakes, involving simple diffusion, facilitated diffusion, and active transport. |
| **Q.9** | **B** | The uptake of minerals by the root hair cells is a combination of passive and active uptakes, involving simple diffusion, facilitated diffusion, and active transport. |
| **Q.10** | **D** | When sugar is added to the source, the water potential of source decreases and when sugar is removed from sink, the water potential of sink increases. |
| **Q.11** | **D** | Three branches which arise from the arch of aorta are Subclavian, carotid and brachiocephalic. |
| **Q.12** | **B** | The muscular extensions of right ventricles are actually cardiac muscles. |
| **Q.13** | **C** | These flaps are attached with fibrous cords called chordeaetendinae, to the papillary muscles. |
| **Q.14** | **B** | P wave: Atrial depolarization<br>Q R S: Ventricular depolarization<br>T wave: Ventricular repolarization |

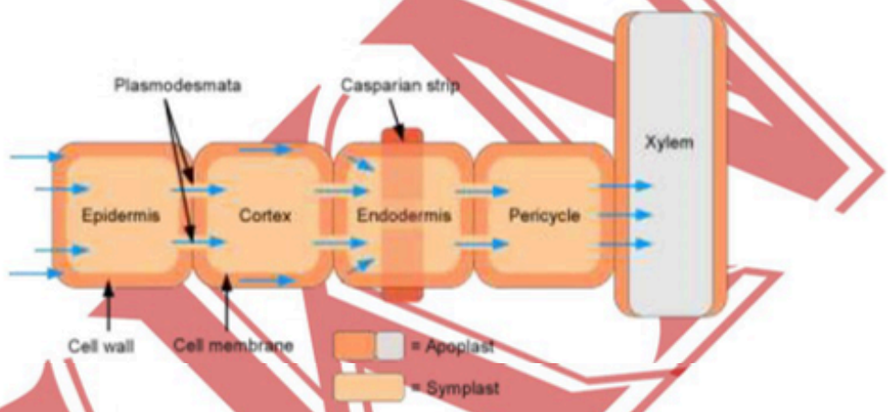
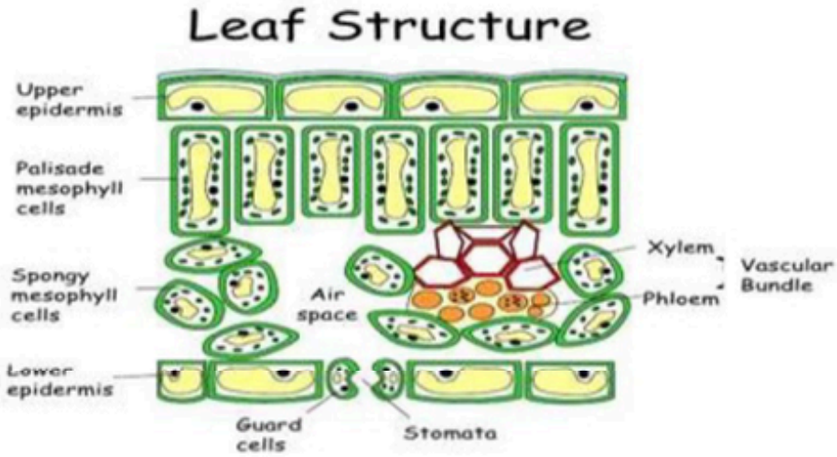
| | | |
|---|---|---|
| **Q.15** | **B** |  |
| **Q.16** | **D** | Heart beat is initiated by pace maker of heart. |
| **Q.17** | **A** | Electrical impulses are generated by pacemaker which initiate heart beat. |
| **Q.18** | **D** | Maximum force is generated by left ventricle so the blood vessel most near to it will have highest pressure of blood. |
| **Q.19** | **A** | P wave: Atrial depolarization<br>Q R S: Ventricular depolarization<br>T wave: Ventricular repolarization |
| **Q.20** | **D** | P wave: Atrial depolarization<br>Q R S: Ventricular depolarization<br>T wave: Ventricular repolarization |
| **Q.21** | **A** | Maximum force is generated by left ventricle so the blood vessel most near to it will have highest pressure of blood. |
| **Q.22** | **C** | Among blood vessels arteries and veins are elastic and muscular and have outer connective tissue layer. Endothelium forms inner most layer of all blood vessels. |
| **Q.23** | **B** | Maximum oxygen will be present in blood before it reaches the tissues where exchange of materials take place. |
| **Q.24** | **D** | Pulmonary artery carries deoxygenated blood towards heart while pulmonary vein carries oxygenated blood towards heart. |
| **Q.25** | **B** | Main difference between arteries and veins is of their elastic nature and smooth muscles. |
| **Q.26** | **C** | Capillaries are not elastic and muscular. They are made up of a single layer of cells. |
| **Q.27** | **C** | Capillaries lack smooth muscles and elastic fibers. The change in their intercellular spaces is brought by chemical and nervous stimulation. |
| **Q.28** | **A** | Arteries and veins have thick walls. Bore size of veins is larger. |
| **Q.29** | **B** | The first pair of arteries that arise form aorta supply blood to myocardium. |
| **Q.30** | **A** | The arteries that provide blood to heart do not arise from arch of aorta or descending aorta. |
| **Q.31** | **A** | Synthesis of plasma proteins is the main function of body's central metabolic station. |
| **Q.32** | **C** | Blood is composed of blood cells and plasma. Plasma is 55% of blood volume. |
| **Q.33** | **B** | Blood – cells = Plasma<br>Plasma – Fibrinogen= Serum |
| **Q.34** | **C** | Plasma contains 90% water. |
| **Q.35** | **B** | The cells which are the component of our immune system have the longest life span. |
| **Q.36** | **B** | Polymorphonuclear cells have lobed nucleus. |
| **Q.37** | **D** | Platelets are colorless and are cytoplasmic fragments of large cells. They are involved in formation of blood clot. |

| | | |
|---|---|---|
| **Q.38** | **C** | Agranulocytes in white blood cells are monocytes and lymphocytes. |
| **Q.39** | **B** | The cells which are specific for parasitic and worm infections are more likely to be increased in such infections. |
| **Q.40** | **B** | NaCl is 2/3rd of inorganic substances in Blood. Thrombin and cholesterol are organic. |
| **Q.41** | **D** | The filtration similar to lymph nodes will take place in lymphoid mass which exposes blood to the action of phagocytes. |
| **Q.42** | **C** | Interstitial fluid is formed due to leakage of plasma as blood cells cannot cross capillaries. |
| **Q.43** | **A** | CNS lacks a traditional lymphatic system. |
| **Q.44** | **B** | Lacteals are the branches of lymph capillaries are present in digestive system where they are involved in transportation of fats. |
| **Q.45** | **D** | Spleen is a lymphoid mass and it is involved in filtration of blood from pathogens by exposing it to the action of phagocytes and lymphocytes. |
| **Q.46** | **D** | Digestive system has lymphoid masses in mucosa and submucosa. |
| **Q.47** | **A** | The left lymphatic duct drains into left subclavian vein and right lymphatic duct drains into right subclavian vein. |
| **Q.48** | **D** | Lymphatic system lacks a proper pump however breathing movements and skeletal muscle movements facilitate its flow. |
| **Q.49** | **A** | Liver is not a lymphoid mass. |
| **Q.50** | **C** | Lymph capillaries unite to form lymph vessels and there are lymph nodes at their junction. |
| **Q.51** | **C** |  |
| **Q.52** | **D** | It is a lymphocyte not processed by the thymus gland, and responsible for producing antibodies. |
| **Q.53** | **B** | Both are phagocytes in blood and tissues and form nonspecific resistance that destroys invaders in a generalized way. |
| **Q.54** | **A** | HIV mainly destroys Cd4 receptor bearing cell. |
| **Q.55** | **D** | Immunity recognizes entry of pathogens and activates body's response to remove these pathogens. |
| **Q.56** | **D** | Antibodies are involved in humoral response by detecting foreign particles and by their removal through various mechanisms. |
| **Q.57** | **C** | Antibodies are involved in humoral response by detecting foreign particles and by their removal through various mechanisms. |
| **Q.58** | **C** | Colostrum is the first secretion of mother's milk and is rich in antibodies. |
| **Q.59** | **C** | Antibodies are transferred from mother blood to fetus blood through placenta. This is a natural way of immunization. |

| | | |
|---|---|---|
| **Q.60** | **C** | Globulin proteins are utilized for the synthesis of immunoglobulins |
| **Q.61** | **A** | Blood is composed of blood cells and plasma. Blood cells are 45% of blood volume. |
| **Q.62** | **C** | Platelets are cell like bodies and they are actually cytoplasmic fragments of large cells with large nucleus. |
| **Q.63** | **B** | The cells which destroy large particles are tissue macrophages. |
| **Q.64** | **B** | Colloid osmotic pressure of blood is mainly maintained by albumin. |
| **Q.65** | **B** | The weight of blood in our body in about 1/12th of whole-body weight. |
| **Q.66** | **C** | Transportation of gases is the function of blood. |
| **Q.67** | **D** | Cardiac muscles are cylindrical and irregularly striped. They are self -controlled by SA node but can also be regulated by autonomic nervous system. |
| **Q.68** | **D** | The chamber responsible for pumping blood to maximum parts of body will have most powerful contractions. |
| **Q.69** | **B** | Inferior and superior vena cava both containing drain into right atrium of heart. |
| **Q.70** | **D** |  |
| **Q.71** | **D** | Normally total heart beats in 60 seconds are 72. |
| **Q.72** | **C** | Heart sounds are mainly produced due to closure of valves. 1st heart sound is due to closure of AV valve and second heart sound is due to closure of SL valve. |
| **Q.73** | **B** | • Femoral veins combine to form iliac veins which form inferior vena cava.<br>• Renal veins drain into inferior vena cava.<br>• Mesenteric veins drain into hepatic portal vein. |
| **Q.74** | **C** | As the age progresses the decrease in elasticity of arteries causes their hardening and thickening. |
| **Q.75** | **B** | As the age progresses the decrease in elasticity of arteries causes their hardening and thickening and formation of atheroma causes narrowing of inner layer of arteries. |
| **Q.76** | **C** | The change in diameter of blood vessels is done by contraction of smooth muscles which are controlled by both nervous and hormonal control. |
| **Q.77** | **B** | Velocity of blood flow is inversely proportional to cross sectional area. |
| **Q.78** | **B** | The function of lymphatic system is to return fluid back to blood in vessels that carry blood towards heart. |
| **Q.79** | **A** | Lymphatic vessels drain into lymphatic ducts. There are two ducts i.e. right and left lymphatic duct. |
| **Q.80** | **D** | Lymph nodes are located in three main regions. CNS lacks a traditional lymphatic system. |
| **Q.81** | **B** | Lymphatic vessels ultimately return the lymph back into blood at the level of subclavian vein. |
| **Q.82** | **D** | Red blood cells are only present in blood vessels; lymph is of white color due to absence of RBCs. |

| | | |
|---|---|---|
| **Q.83** | **D** |  |
| **Q.84** | **D** | Immunity recognizes entry of pathogens and activates body's response to remove these pathogens. |
| **Q.85** | **C** | 1st line defense consists of physical barriers (Mucous membrane, skin and blood clot) and chemical barriers (HCl, tears and saliva). |
| **Q.86** | **D** | Basophils are involved in producing inflammation and allergic reactions. |
| **Q.87** | **B** | It occurs when a person is exposed to a live pathogen, and develops a primary immune response, which leads to immunological memory. |
| **Q.88** | **B** | Vaccination is done for infectious diseases caused by pathogens. |
| **Q.89** | **A** |  |
| **Q.90** | **B** | Root pressure is created by the active secretion of salts and into the xylem sap. This lowers the water potential of xylem sap. Water enters the xylem cells by osmosis, thus increasing the level of sap in the xylem cells. It may take apoplast, symplast or vacuolar pathway increasing the hydrostatic pressure in cells, this pushes the water upwards. |
| **Q.91** | **A** | 1% water is used for photosynthesis, while remaining 99% is transpired and used for thermoregulation. |
| **Q.92** | **A** | Due to imbibition seed coat absorbs water because it has lignin, pectin and cellulose. Due to this affinity seed coat swells and burst. |

| | | |
|---|---|---|
| Q.93 | D |  |
| Q.94 | D | Root pressure is created by the active secretion of salts and other solutes from the other cells into the xylem sap. Water enters the xylem cells by osmosis and increases the level of sap in the xylem cells. It may take apoplast, symplast or vacuolar pathway increasing the hydrostatic pressure in cells, this pushes the water upwards. |
| Q.95 | D |  |
| Q.96 | D | Diffusion is the movement of solute and solvent, while osmosis is the movement of only solvent molecules from higher concentration to lower concentration. |
| Q.97 | B | Rate of transpiration is directly proportional to light, temperature and wind, while it is inversely proportional to humidity in air. |
| Q.98 | D |  |

| | | |
|---|---|---|
| | | Ions moving in the apoplast can only reach the endodermis, where casparian strips prevent further progress. To cross the endodermis, ions mustpass by diffusion or active transport into endodermis cells, entering their cytoplasm, and possiblytheir vacuoles. |
| **Q.99** | **B** | Wilting appears when the amount of water lost from the plant during transpiration is greater the amount of water absorbed from the soil. |
| **Q.100** | **C** | The water molecules leaving the xylem are attached to other water molecules in the same xylem tube by hydrogen bonds called cohesion of water molecules. |
| **Q.101** | **B** | Transpiration pull provides necessary energy to the sap (water and minerals) in xylem tissue for the movement of water to aerial parts of plants |
| **Q.102** | **B** | Water is found in the spaces between the soil particles. Water and mineral salts first enter through the cell wall and cell membrane of the root hair cell, only when the concentration of solute sap is high, by osmosis. |
| **Q.103** | **C** | Water is found in the spaces between the soil particles. Water and mineral salts first enter through the cell wall and cell membrane of the root hair cell by osmosis. It occurs only when the concentration of solute sap is high, or the water potential of the root cell is less. |
| **Q.104** | **D** |  |
| **Q.105** | **A** | Plasmodesmata are the narrow thread of cytoplasm that passes through the cell walls of adjacent plant cells and allows communication between them. |
| **Q.106** | **D** |  |
| **Q.107** | **C** | Thus transpiration is called as a 'necessary evil' because it is an inevitable process. The loss of water can lead to wilting, serious desiccation, and shortage of water. But even then this process is needed because it helps in the ascent of the sap and the pulling of the water from the roots to the tips. |

| | | |
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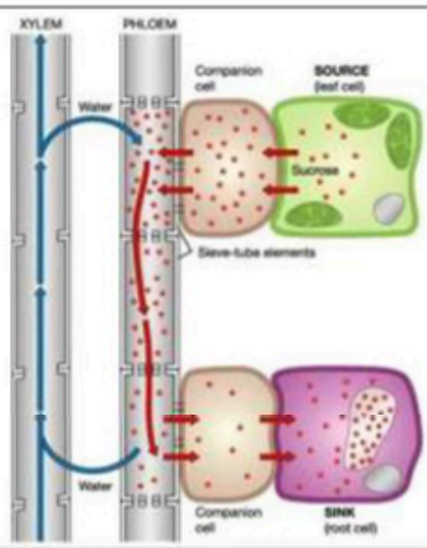
| **Q.108** | **B** |  |
| **Q.109** | **D** | Phloem tissue consists of conducting cells, generally called sieve elements, parenchyma cells, including both specialized companion cells and unspecialized cells and supportive cells, such as fibres and sclereids. |
| **Q.110** | **C** | Pressure floe theory is the most widely accepted theory that explains the transport of sugars in the phloem. |

# COORDINATION AND CONTROL/NERVOUS AND CHEMICAL COORDINATION

## Steps involved in Nervous Coordination, Neurons (Structure and Types) & Sensory Receptors and Their Working

**Q.1 It is the main coordinating system of human body:**
A. Respiratory system
B. Nervous system
C. Hormonal system
D. Circulatory system

**Q.2 The mechanisms that is found in animals only:**
A. Diffusion
B. Nervous control
C. Respiration
D. Hormonal control

**Q.3 Receptors in ear for detection of sound are examples of**
A. Chemoreceptors
B. Thermoreceptors
C. Mechanoreceptors
D. Nociceptor

**Q.4 Which of the following type of receptors are also called as 'electromagnetic receptors?**
A. Chemoreceptors
B. Mechanoreceptorsq
C. Nociceptors
D. Photoreceptors

**Q.5 All of the following structures are found in axoplasm except:**
A. Nucleus
B. Microtubules
C. Neurofibrils
D. Mitochondria

**Q.6 Intermediate or relay neurons are also called as:**
A. Sensory neurons
B. Motor neurons
C. Associative neurons
D. Glial cells

**Q.7 Axonal and dendrital fibers can regenerate if _____ is intact:**
A. Myelin sheath
B. Cell body
C. Cell processes
D. Nissl's granules

**Q.8 Which of the following types of neurons are found in human central nervous system?**
A. Sensory neurons
B. Motor neurons
C. Associative neurons
D. All A, B, C

**Q.9 How many axons will be present in a multipolar neuron**
A. Multiple
B. No axon
C. 1
D. 4

**Q.10 Single long dendron is a character of:**
A. Sensory neuron
B. Associative neuron
C. Motor neuron
D. All A, B, C

## Reflex Action and Reflex Arc, Nerve Impulse & Synapse

**Q.11 For sound (good) reflex action, we require intact:**
A. Spinal cord
B. Cerebellum
C. Hypothalamus
D. Medulla oblogata

**Q.12 Nerve impulse in neuron is initiated by the opening of:**
A. Na – gate
B. K – gate
C. Cl – channel
D. Na-K pump

**Q.13 The normal speed of nerve impulse in humans is:**
A. 90 m/s
B. 100 m/s
C. 110 m/s
D. 120 m/s

**Q.14 Leakage of $K^+$ ions out of neuron cell is an example of:**
A. Diffusion
B. Osmosis
C. Active transport
D. Facilitated diffusion

**Q.15 All of the following are true about resting membrane potential except:**
A. Electrically positive outside
B. Electrically negative inside
C. Non-conducting neuron
D. Neuron at neutral state

**Q.16 Transport through Na-K pump is:**
A. Direct active transport
B. Indirect active transport
C. Facilitated diffusion
D. Carrier mediated transport

**Q.17 Communication between two neurons at synapse is made through:**

A. Cytoplasmic connections
B. Microscopic gaps
C. Neurotransmitters
D. Plasmodesmata

**Q.18 Synaptic vesicles fuse with pre-synaptic membrane and release neurotransmitter molecules into:**

A. Cell body of pre-synaptic neuron
B. Cell body of post-synaptic neuron
C. Synaptic cleft
D. Synaptic knob

**Q.19 Neuromuscular junction is an example of:**

A. Physical synapse
B. Electrical synapse
C. Chemical synapse
D. Biological synapse

**Q.20 It is the main neurotransmitter for synapses that lie outside the central nervous system:**

A. Acetylcholine
B. Adrenalin
C. Serotonin
D. Dopamine

## Central Nervous System, Peripheral Nervous System

**Q.21 The primary function of spinal cord is to:**

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

**Q.22 Spinal cord serves as the center of:**

A. Thought
B. Reflexes
C. Learning
D. Memory

**Q.23 Appearance of white matter is due to:**

A. Cell body
B. Cell processes
C. Nucleus
D. Myelin sheath

**Q.24 Spinal nerves carry impulse towards all of the following except:**

A. Brain
B. Spinal cord
C. Effectors
D. Muscles

**Q.25 Sciatic nerve is an example of:**

A. Motor cranial nerve
B. Mixed cranial nerve
C. Motor spinal nerve
D. Mixed spinal nerve

**Q.26 Motor neurons in our body form:**

A. Sympathetic nervous system
B. Somatic nervous system
C. Parasympathetic nervous system
D. All A, B, C

**Q.27 All of the following body functions are controlled by ANS except:**

A. Limb movement
B. Digestion in stomach
C. Glandular secretions
D. Blood pressure

**Q.28 It inhibits secretions of digestive tract:**

A. Sympathetic nervous system
B. Parasympathetic nervous system
C. Peripheral nervous system
D. Central nervous system

**Q.29 Sympathetic nervous system in our body does not accelerate:**

A. Heart rate
B. Dilation of pupils
C. Rate of blood flow
D. Digestion of food

**Q.30 Stimulation of vagus nerve will cause:**

A. Increased blood pressure
B. Increased blood flow to limbs
C. Decreased heart rate
D. Dilation of pupil

## Hormones- The chemical Messengers, Endocrine System of Man (Hypothalamus), Pituitary Gland

**Q.31 Hormones are transported to their target sites through:**

A. Ducts
B. Blood
C. Lymph
D. Cells

**Q.32 Insulin and glucagon are:**

A. Proteins
B. Amino acid derivatives
C. Polypeptides
D. Steroids

**Q.33 Hormones of which of the following glands are amino acid derivatives?**

A. Islets of Langerhans
B. Anterior pituitary
C. Adrenal cortex
D. Adrenal medulla

**Q.34 All are amino acid derivatives except:**

A. Thyroxin
B. Epinephrine
C. Aldosterone
D. Nor-adrenalin

**Q.35 It is an example of neurosecretion:**

A. TSH
B. ADH
C. Insulin
D. Glucagon

**Q.36 It is the part of our body where sensory stimuli of nervous system are converted into hormonal responses:**

A. Thalamus
B. Hypothalamus
C. Anterior pituitary
D. Posterior pituitary

**Q.37 Which of the following is an example of neurosecretion?**

A. Prolactin
B. Vasopressin
C. Calcitonin
D. Aldosterone

**Q.38 Anterior lobe of pituitary gland produces:**

A. Primary hormones only
B. Tropic hormones only
C. Both primary & tropic hormones
D. Trophic factors only

**Q.39 Tropic hormones in our body are produced by:**

A. Hypothalamus only
B. Anterior pituitary only
C. Hypothalamus & anterior pituitary
D. Anterior & posterior pituitary

**Q.40 Abnormal development of hands, feet and jaws in an adult due to excess secretion of growth hormone is called:**

A. Microcephaly
B. Polydactyl
C. Acromegaly
D. Gigantism

## Thyroid Gland, Parathyroid Gland & Pancreas

**Q.41 Goiter occurs during:**

A. Hyperthyroidism
B. Hypothyroidism
C. Cushing disease
D. Both A & B

**Q.42 A hormone that stimulates the breakdown of glucose and release of heat and generation of ATP:**

A. Thyroxin
B. Calcitonin
C. Insulin
D. Glucagon

**Q.43 An action that is not associated with thyroid gland:**

A. Generation of heat
B. Growth & sexual maturation
C. Differentiation of brain
D. Deposition of fats

**Q.44 Correct function of calcitonin is to:**

A. Decrease blood calcium level
B. Increase blood calcium level
C. Decrease calcium level in bones
D. Muscle proteins breakdown

**Q.45 Under activity of parathyroid gland may lead to:**

A. Muscular tetany
B. Demineralization of bone
C. Rickets
D. Kidney stone

**Q.46 Which of the following organ does not play any role in the regulation of blood-glucose levels?**

A. Parathyroid
B. Adrenal cortex
C. Pancreas
D. Anterior pituitary

**Q.47 Which of the following hormone depresses blood glucose level?**

A. Insulin
B. Glucagon
C. Cortisol
D. Calcitonin

**Q.48 Glucagon increases blood glucose level mainly by increasing breakdown of:**

A. Proteins
B. Fats
C. Glycogen
D. Starch

**Q.49 Diabetes mellitus is caused due to:**

A. Under-secretion of insulin
B. Overproduction of glucagon
C. Under-secretion of ADH
D. Overproduction of cortisol

**Q.50 The islets of Langerhans have large number of _____ associated with production of_____:**

A. α cells, Insulin
B. α cells, Glucagon
C. β cells, Insulin
D. β cells, Glucagon

## Adrenal Glands, Gonads

**Q.51 Hormones secreted from adrenal cortex are:**

A. Proteins
B. Polypeptides
C. Amino acid derivatives
D. Steroids

**Q.52 Group of hormones that are not produced from adrenal cortex:**

A. Corticosteroids
B. Androgens
C. Gonadotrophins
D. Gluco-corticoids

**Q.53 Excess of adrenaline & nor-adrenaline may lead to:**

A. Addison's disease
B. Cushing disease
C. Low blood glucose
D. High blood pressure

**Q.54 It is the principal hormone secreted from adrenal medulla under stress situations:**

A. Cortisol
B. Aldosterone
C. Adrenaline
D. Calcitonin

**Q.55 In Addison's disease, muscular weakness occurs due to:**

A. Protein breakdown
B. Hyperglycaemia
C. Imbalance of salts
D. Darkening of skin

**Q.56 Development of certain male characters in female is due to tumor of:**

A. Adrenal medulla
B. Thyroid
C. Adrenal cortex
D. Testis

**Q.57 Which of the following actions are not common for estrogen and progesterone?**

A. Inhibition of FSH
B. Secondary sexual characters
C. Thickening of uterus
D. Proliferation of endometrium

**Q.58 Deficiency of sex hormones in a female will result in:**

A. Fertility
B. Oogenesis
C. Failure to mature sexually
D. Secondary sex characteristics development

**Q.59 Testosterone production in male starts from:**

A. Embryonic stage
B. Foetal stage
C. Birth
D. Puberty

**Q.60 The castrated male shows:**

A. Loss of male secondary sex characters
B. Sterility
C. Loss of female characters
D. Both A & B

**Q.61 Nervous coordination involved specialized cells called _____, linked together directly or via the CNS to form network.**

A. Nephrons
B. Kupffer cells
C. Neurons
D. Neuroglia

**Q.62 Baroreceptors (Pressure receptors) are located in our:**

A. Spinal cord
B. Brachial arteries
C. Carotid arteries
D. Nasal cavity

**Q.63 Structures that detect change in environment are called:**

A. Stimuli
B. Receptors
C. Control center
D. Effectors

**Q.64 In case of neuron, the charge separating barrier is:**

A. Endoplasmic reticulum
B. T tubules
C. Plasma membrane
D. Myelin sheath

**Q.65 The cell membrane of neuron is virtually impermeable to all ions except:**

A. $Na^{+}$ ions
B. $K^{+}$ ions
C. $Ca^{+2}$ ions
D. $Cl^{-}$ ions

**Q.66 Cell bodies of sensory neurons are usually located in:**

A. Gray matter of spinal cord
B. White matter of spinal cord
C. Dorsal root ganglion
D. Ventral root ganglion

**Q.67 These have long axons:**

A. Sensory neurons
B. Motor neurons
C. Associative neurons
D. All A, B, C

**Q.68 It can be more than a meter long in some neurons:**

A. Dendrite
B. Axon
C. Ganglion
D. Soma

**Q.69 A receptor is connected with spinal cord by:**

A. Sensory neuron
B. Motor neuron
C. Efferent neuron
D. Interneuron

**Q.70 It is the pathway of passage of impulse during reflex action:**

A. Nerve
B. Involuntary action
C. Reflex arc
D. Spinal cord

**Q.71 A reflex action:**

A. Occurs involuntarily
B. Requires the involvement of CNS
C. Is protective
D. All A, B, C

**Q.72 Nerve impulse involves:**

A. Electrochemical changes
B. Chemical reactions
C. Movement of ions
D. All A, B, C

**Q.73 When neuron is in non-conducting state, it is in:**

A. Resting membrane potential & neutral state
B. Resting membrane potential & polarized state
C. Action potential & neutral state
D. Action potential & polarized state

**Q.74 Minimum amount of stimulus required to initiate nerve impulse is called:**

A. Subthreshold stimulus
B. Threshold stimulus
C. Action potential
D. Variable stimulus

**Q.75 It restores original ionic gradient and resting potential (recovery):**

A. $Na^+$-gate
B. $K^+$ - gate
C. $K^+$-pump
D. $Na^+$ - $K^+$ pump

**Q.76 Speed of nerve impulse will be reduced by:**

A. Myelination
B. Small diameter of nerve fiber
C. Node of Ranvier
D. Large diameter of nerve fiber

**Q.77 All of the following are examples of neurotransmitters except:**

A. Acetylcholine
B. Adrenalin
C. Dopamine
D. Oxytocin

**Q.78 Which of the following cannot get across synapse?**

A. Single nerve impulse
B. Impulse of supra-threshold value
C. Multiple impulses in rapid succession
D. Multiple impulse from multiple neurons

**Q.79 Chemical messengers involved in synaptic transmission are:**

A. Hormones
B. Enzymes
C. Neurotransmitters
D. Synaptic vesicles

**Q.80 Gray matter of spinal cord contains:**

A. Cell bodies only
B. Myelinated tracts only
C. Cell bodies & myelinated tracts
D. Cell bodies & non-myelinated tracts

**Q.81 In nervous system, white matter is made up of:**

A. Cell bodies of neurons
B. Myelinated nerve tracts
C. Non-myelinated nerve tracts
D. Cell bodies & myelinated parts

**Q.82 A nerve:**

A. Is the same as a neuron
B. Is a pathway within the central nervous system
C. Is a bundle of neuron fibers
D. Usually contains only motor neurons

**Q.83 Peripheral nervous system is further divided into:**

A. Motor and sensory divisions
B. Autonomic and somatic divisions
C. Sympathetic and parasympathetic systems
D. Spinal cord and brain

**Q.84 Sympathetic and parasympathetic nervous systems are divisions of:**

A. Central nervous system
B. Peripheral nervous system
C. Somatic nervous system
D. Autonomic nervous system

**Q.85 All of the following actions are accelerated by sympathetic nervous system except:**

A. Increase in heart beat
B. Dilation of pupils
C. Increase in breathing rate
D. Increase in peristalsis

**Q.86 Smooth muscles are innervated by:**

A. Peripheral nervous system
B. Hormones
C. Central nervous system
D. Autonomic nervous system

**Q.87 Hormones are secretions of:**

A. Endocrine glands only
B. Exocrine glands only
C. All glands
D. All cellular secretions

**Q.88 Chemical messengers of endocrine system are:**

A. Enzymes
B. Hormones
C. Neurotransmitters
D. Trophic factors

**Q.89 It is true about all hormones:**

A. Organic substances
B. Inorganic substances
C. Protein substances
D. Lipid substances

**Q.90 Which of the following is the part of both nervous system and endocrine system?**

A. Thalamus
B. Hypothalamus
C. Anterior pituitary
D. Posterior pituitary

**Q.91 Release of TRF from hypothalamus is controlled by the levels of _____ in blood:**

A. Iodine
B. TSH
C. Thyroxine
D. Steroid

**Q.92 Inhibition of secretion of melanophore stimulating hormone is controlled by:**

A. Hypothalamus
B. Pineal gland
C. Anterior pituitary
D. Median pituitary

**Q.93 It is believed that oxytocin and antidiuretic hormone are produced in:**

A. Thalamus
B. Anterior pituitary
C. Hypothalamus
D. Posterior pituitary

**Q.94 A lack of antidiuretic hormone causes:**

A. Diabetes mellitus
B. Diabetes insipidus
C. Grave's disease
D. Cushing disease

**Q.95 FSH in male stimulates:**

A. Follicle development
B. Estrogen secretion
C. Milk production
D. Sperm production

**Q.96 Oxytocin acts on all sites except**

A. Uterus
B. Mammary glands
C. Myometrium
D. Ovary

**Q.97 A person with hypo functioning of anterior pituitary would probably show all of the following symptoms except:**

A. Decreased metabolic rate
B. Sexual immaturity
C. Decreased activity of the adrenal cortex
D. Increased urine output

**Q.98 Which of the following is not a function of amino acid derivative hormones?**

A. Increase metabolic rate
B. Growth and development
C. Increase blood glucose level
D. Decrease blood calcium

**Q.99 A diet having no or less iodine will cause decreased production of:**

A. PTH
B. TSH
C. T4
D. STH

**Q.100 Which of the following thyroid hormone is not under the control of TSH?**

A. Tri-iodothyronine
B. Tetra-iodothyronine
C. Calcitonin
D. Thyroxin

**Q.101 These two hormones are antagonist to each other:**

A. T3 & T4
B. Calcitonin & parathormone
C. Glucagon & cortisol
D. Adrenaline & nor-adrenaline

**Q.102 A person has poorly functioning β- cells in the islets of Langerhans. What will be the concentration of glucose, insulin and glucagon in the blood after that person has eaten a meal rich in carbohydrates?**

A. Glucose → High, Insulin → Low, Glucagon → High
B. Glucose → High, Insulin → Low, Glucagon → Low
C. Glucose → Low, Insulin → High, Glucagon → High
D. Glucose → Low, Insulin → High, Glucagon → Low

**Q.103 In a normal person, the pancreas secretes insulin immediately after ingestion of carbohydrates. Which one of the following is not an effect of insulin?**

A. It promotes the transport of glucose from the blood into muscle cells
B. It stimulates glycogen synthesis from glucose by the liver
C. It promotes the synthesis of fats from glucose in adipose cells
D. It stimulates the convoluted tubules of the kidney to reabsorb more sugar

**Q.104 Insulin depresses blood glucose level by all of the following means except:**

A. Increasing glycogen synthesis
B. Increasing cell utilization of glucose
C. Conversion of glucose into lipid
D. Increasing hydrolysis of glycogen

**Q.105 Higher blood sugar level, dehydration and loss of valuable metal ions are symptoms of:**

A. Grave's disease
B. Diabetes mellitus
C. Addison's disease
D. Cushing disease

**Q.106 Excess or deficiency of ACTH will affect the functioning of:**

A. Hypothalamus
B. Anterior pituitary
C. Adrenal cortex
D. Adrenal medulla

**Q.107 The adrenal cortex is active in:**

A. Shock
B. Stress
C. Infection
D. All A, B, C

**Q.108 Which of the following are normal responses to the secretion of adrenaline (epinephrine) in humans?**

**I. Increase in heart rate**
**II. Mobilization of glucose reserves**
**III. Dilation (expansion) of the eye pupil**
**IV. Increase in blood flow to the skin**

A. I only
B. I and II only
C. II and III only
D. I, II and III only

**Q.109 Which one of the following controls the secretion of testosterone from testes?**

A. FSH
B. Luteinizing hormone
C. Luteotropic hormone
D. Oxytocin

**Q.110 Higher level of thyroxine will inhibit the cells that produce and secrete:**

A. Thyrotrophin releasing hormone
B. Thyroid stimulating hormone
C. TRF & TSH
D. T3 & T4

## ANSWERS & EXPLANTION: -

| | | |
|---|---|---|
| **Q.1** | **B** | The systems which are responsible for the coordination of different parts and processes of animal body includes:<br>• Nervous system (relatively fast)<br>• Hormonal system (relatively slow) |
| **Q.2** | **B** | Animals have to respond quickly to the diverse environmental changes in a fraction of time therefore, they need a more efficient coordination system |
| **Q.3** | **C** | Sound waves exert mechanical pressure on the eardrum which is detected by mechanoreceptors and transmitted to the cerebral cortex. |
| **Q.4** | **D** | Since, photoreceptors are associated with the detection of stimulus of light, which are electromagnetic in nature; hence, these receptors are also called as electromagnetic receptors |
| **Q.5** | **A** | The central part of neuron which give rise to cytoplasmic processes and contain nucleus and other organelles embedded in cytoplasmic matrix is called soma. |
| **Q.6** | **C** | Intermediate neurons are present in the CNS only and are involved in the processing of information. |
| **Q.7** | **B** | Neurons, once mature, do not divide. However, cell body can regenerate demerged dendrites and axon. |
| **Q.8** | **D** | Human CNS contains differentiated neurons performing specific functions. |
| **Q.9** | **C** | Neurons are classified as unipolar, bipolar and multipolar on the basis of dendrites that originate from the cell body. |
| **Q.10** | **A** | Peripheral branch of sensory neuron between receptor and dorsal root ganglion is long, single and axon-like in structure. |
| **Q.11** | **A** | In vertebrates, most sensory neurons do not pass directly into the brain, but synapse in the spinal cord. This allows for faster reflex actions to occur by activating spinal motor neurons without the delay of routing signals through the brain. So, the spinal cord must be intact to carry out reflex actions quickly. |
| **Q.12** | **A** | Threshold stimulus is responsible for the opening of Na-gates. As a result, Na ions rush in to the neuron due to concentration gradient difference. |
| **Q.13** | **B** | In humans maximum speed of impulse is observed in myelinated neurons which can be up to 120 m/s |
| **Q.14** | **A** | Movement of potassium ions outside the neuron does not require energy or carrier proteins. |
| **Q.15** | **D** | During RMP, the neuronal membrane is more positive from outer surface as compared to inner surface. |
| **Q.16** | **A** | Active transport involves the movement of molecules against the concentration gradient by utilization of ATP (direct active) or by using some other energy source like electrons (indirect active). |
| **Q.17** | **C** | Gaps are meant for disconnection; reconnection is done by chemicals whether in chemical or nervous coordination. |
| **Q.18** | **C** | In chemical synapse, neurotransmitters release from presynaptic membrane of axon in synaptic cleft, where they bind to the receptors located on postsynaptic membrane of dendrite. |
| **Q.19** | **C** | Acetylcholine is use to transmit impulse from neuron to muscle fiber at neuromuscular junction. |
| **Q.20** | **A** | Adrenaline, nor-adrenaline, serotonin and dopamine are mainly used within CNS synapses. |

| | | |
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| **Q.21** | **B** | Spinal cord acts as a link between sensory information sent towards brain and motor responses towards body. |
| **Q.22** | **B** | Thoughts, memories and learning are the functions of higher brain center. |
| **Q.23** | **D** | White matter contains myelinated parts of neurons. |
| **Q.24** | **A** | Spinal nerves are part of peripheral nervous system and they innervate body organs with spinal cord. |
| **Q.25** | **D** | Sciatic nerve originates from spinal cord. |
| **Q.26** | **D** | Autonomic and somatic nervous system comes under the motor division of nervous system. |
| **Q.27** | **A** | ANS mainly controls involuntary actions. |
| **Q.28** | **A** | ANS innervates glands, cardiac and smooth muscles. Secretions of glands of digestive tract occur predominantly in rest conditions. |
| **Q.29** | **D** | Sympathetic nervous system initiates such responses which help in fight and flight responses. |
| **Q.30** | **C** | Vagus nerve is the part of parasympathetic division of ANS. |
| **Q.31** | **B** | Hormones are chemical messengers and are produced by specialized endocrine glands or cells. After release, they are delivered to their target sites by transport system |
| **Q.32** | **A** | Amino acid derivative hormones are produced from thyroid and adrenal medulla. Steroids are produced from gonads and adrenal cortex. |
| **Q.33** | **D** | Thyroxine, T3, epinephrine and nor epinephrine are amino acid derivatives. |
| **Q.34** | **C** | Amino acid derivative hormones are produced from thyroid and adrenal medulla. |
| **Q.35** | **B** | Hormones produced from neurosecretory cells of hypothalamus are called as neurosecretions. |
| **Q.36** | **B** | Sensory stimuli are detected by neurosecretory cells which respond by producing releasing and inhibiting factors. |
| **Q.37** | **B** | Hormones which are produced by neurosecretory cells of hypothalamus are called as neurosecretions. |
| **Q.38** | **C** | Anterior lobe of pituitary produces hormones which act on other endocrine glands i.e. TSH, ACTH. It also produces hormones which directly regulate the functioning of cells i.e. prolactin. |
| **Q.39** | **C** | Such hormones which acts on other endocrine glands and regulate their secretions are called as tropic hormones. |
| **Q.40** | **C** | Excess of growth hormones in early life leads to the abnormal growth of whole body which is called gigantism. |
| **Q.41** | **B** | Goiter is due to the increase in size of thyroid gland and can be seen in over activity and under activity of thyroid. |
| **Q.42** | **A** | More breakdown of glucose to release ATP and production of heat are related to increased basal metabolic rate |
| **Q.43** | **D** | Thyroid Hormones:<br>• T3/T4 (Thyroxin): regulate BMR, regulate growth along with STH and promote neuron differentiation.<br>• Calcitonin: regulate $Ca^{+2}$ level |
| **Q.44** | **A** | Hormones responsible for regulating blood $Ca^{+2}$ level are:<br>• Calcitonin: regulate blood $Ca^{+2}$ ions in to the bones<br>• Parathormone: regulate $Ca^{+2}$ ions from bones to the blood |

| | | |
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| **Q.45** | **A** | Parathyroid gland produces parathormone which is released in response to low blood calcium levels and it regulate calcium from bones to the blood. Its deficiency leads to hypocalcemia. |
| **Q.46** | **A** | Parathormone regulate blood calcium level and release as a result of hypocalcem |
| **Q.47** | **A** | Glucagon and cortisol increase blood glucose level. |
| **Q.48** | **C** | Glucagon works antagonistically to insulin by preventing glycogenesis and promoting glycogenolysis and lipolysis. |
| **Q.49** | **A** | Diabetes mellitus is characterized by elevated blood glucose levels due to insulin abnormality. |
| **Q.50** | **C** | More cells of islets of Langerhans are involved in reduction of blood glucose level. |
| **Q.51** | **D** | Hormones of adrenal cortex are called as corticosteroids. |
| **Q.52** | **C** | Adrenal cortex is involved in the production of corticosteroids and androgens |
| **Q.53** | **D** | Both adrenaline and nor adrenaline work synergistically to raise blood pressure. |
| **Q.54** | **C** | Adrenal medulla produces amino acid derivatives that deal with stress conditions by elevating blood pressure. |
| **Q.55** | **C** | Destruction of adrenal cortex results in deficiency of corticosteroids, which leads to low blood glucose level and mineral imbalance. This ultimately results in muscular weakness. |
| **Q.56** | **C** | A tumor on adrenal cortex leads to its hyperactivity in older females. This is the main cause of appearance of male characters in females. |
| **Q.57** | **B** | The hormones which control the secondary sexual characters in males and females are testosterone and estrogen, respectively. |
| **Q.58** | **C** | Sex hormones in male and female are important for gametogenesis and sexual maturity |
| **Q.59** | **B** | Sex hormones are produced from reproductive organs before birth and their level rises fairly consistently until puberty. |
| **Q.60** | **D** | Removal of male gonads results in lack of testosterone which ultimately results in under developed male secondary sex characters. |
| **Q.61** | **C** | Neurons are cells within the nervous system that transmit information to other nerve cells, muscle, or gland cells and are responsible for nervous coordination. |
| **Q.62** | **C** | Larger blood vessels also help in the regulation of blood pressure along with heart by detecting blood pressure via stretch receptors. |
| **Q.63** | **C** | Any change in external or internal environment is detected by specialized neuron endings, cells or organs which act as receptors. |
| **Q.64** | **C** | The neuronal membrane, during RMP, is more positive from outside as compared to inner surface due to ionic distribution across it. |
| **Q.65** | **B** | At rest state, Na ions are 10 times high in concentration outside the neuron while K ions are 20 times high inside the neuron. During this state, small amount of K ions leaks outside though plasma membrane via K ion channels. |
| **Q.66** | **C** | Cell bodies of sensory neurons are present outside the CNS. |
| **Q.67** | **B** | Axon of motor neurons conduct impulses at longer distances therefore, they are several meters long. |
| **Q.68** | **B** | Axons of motor neurons exit from spinal cord and innervate with far-situated effectors. Thus, they are several meters long. |
| **Q.69** | **A** | Receptors give input to CNS by sensory neurons whereas output is provided to the effectors by motor neurons. |
| **Q.70** | **C** | Reflex arc is the pathway of passage of impulse during reflex action: |

| | | |
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| **Q.71** | **D** | A reflex or reflex action is an involuntary, protective and nearly instantaneous movement in response to a stimulus. A reflex is made possible by neural pathways called reflex arcs which can act on an impulse before that impulse reaches the brain |
| **Q.72** | **D** | Nerve impulse is a series of electrochemical changes which run throughout the length of neuron. |
| **Q.73** | **B** | Activity of neuron can only be observed when there is a reversal of charges across the membrane. |
| **Q.74** | **B** | The stimulus that generates action potential in a neuron is called as threshold stimulus |
| **Q.75** | **D** | During depolarization, Na ions rush into the neuron while during repolarization, K ions rush out of the neuron. This results in shift of ionic gradient which is restored by $Na^{+}$-$K^{+}$ pumps. |
| **Q.76** | **B** | Speed of nerve impulse is directly proportional to the diameter and myelination of a neuron. |
| **Q.77** | **D** | Hormones are the chemical messengers which travel to the target site through blood and involve in chemical coordination. |
| **Q.78** | **A** | In order to cross the synapse, neurotransmitters must release via exocytosis. This requires persistent reinforcement of nerve impulses. |
| **Q.79** | **C** | In synaptic transmission chemical messengers are released from presynaptic neurons and bind to the post synaptic ones. |
| **Q.80** | **D** | Gray matter contains non myelinated parts of a neuron. |
| **Q.81** | **B** | Grayish color in CNS appears due to the absence of myelin sheath. |
| **Q.82** | **C** | Nerve is a collection of dendrites or axons bounded by connective tissue and present outside the CNS. |
| **Q.83** | **A** | Brain and spinal cord comprise CNS. Peripheral nervous system consists of pathways that carry message towards the brain and deliver message from the brain. |
| **Q.84** | **D** | Peripheral nervous system consists of sensory and motor divisions. Motor division further consists of somatic and autonomic nervous system. |
| **Q.85** | **D** | Sympathetic nervous system initiates such responses which help in fight and flight responses. |
| **Q.86** | **D** | Peripheral nervous system has two divisions, somatic division innervates skeletal muscles and autonomic nervous system innervates glands, smooth and cardiac muscles. |
| **Q.87** | **A** | Hormones are chemical messengers and are produced by specialized glands or glandular cells. After release, they are delivered to their target sites through blood. |
| **Q.88** | **B** | Chemical messengers of nervous system are neurotransmitters while hormones are the part of endocrine system. |
| **Q.89** | **A** | Nature of hormone<br>• Amino acid derivatives<br>• Polypeptides<br>• Proteins<br>• Steroids |
| **Q.90** | **B** | Hypothalamus contains neurosecretory cells and controls the secretions of pituitary gland. |
| **Q.91** | **C** | Feedback mechanism is involved in the regulation of releasing factors produced from hypothalamus by detecting the levels of hormones in blood. |
| **Q.92** | **A** | Hypothalamus mainly produce releasing factors for the release of hormones form anterior pituitary and inhibitory hormones for inhibiting the secretions from median pituitary. |
| **Q.93** | **C** | The oxytocin and ADH are produced by neurosecretory cells of hypothalamus and then transported towards the anterior pituitary and stored there. |
| **Q.94** | **B** | Absence of ADH will cause decreased reabsorption of water which results in production of dilute urine. |

| | | |
|---|---|---|
| **Q.95** | **D** | FSH in males acts on the cells of germinal epithelium and Sertoli cells. |
| **Q.96** | **D** | Oxytocin is responsible for birth and it also causes milk ejection from mammary glands. |
| **Q.97** | **D** | Hormones produced by anterior pituitary include STH, ACTH, TSH, FSH, LH and Prolactin. |
| **Q.98** | **D** | Amino acid derivative hormones are produced from thyroid and adrenal medulla. |
| **Q.99** | **C** | Iodine mainly responsible for the normal functioning of thyroid gland as it is the part of T3 and T4 hormones. |
| **Q.100** | **C** | Secretion of TSH is regulated through negative feedback mechanism by monitoring blood thyroxine levels. |
| **Q.101** | **B** | **Synergistically working hormones:**<br>• T3 & T4: Control BMR<br>• Glucagon & Cortisol: Regulate blood glucose level<br>• Adrenalin & nor-adrenaline: Regulate blood pressure |
| **Q.102** | **B** | Malfunctioning β- cells will not produce enough insulin in response to the blood glucose being absorbed from the digestive tract. As a result, blood glucose level will received. |
| **Q.103** | **D** | Main function of insulin is to decrease blood glucose level. |
| **Q.104** | **D** | Insulin lowers blood glucose level by:<br>- Increase peripheral uptake and utilization of glucose<br>- Increase the conversion of glucose into glycogen<br>- Decrease glycogenolysis<br>- Increase the conversion of glucose into protein and fats |
| **Q.105** | **B** | Deficiency of insulin causes hyperglycemia which results in metabolic disturbances related to loss of metal cations. |
| **Q.106** | **C** | ACTH is a tropic hormone and it regulates the production and secretions of corticosteroids from adrenal cortex. |
| **Q.107** | **D** | Activity of adrenal cortex is dominant during shock, stress and infections |
| **Q.108** | **D** | Adrenaline contributes in raising blood pressure by increasing cardiac output and by increasing blood flow to skeletal muscles. It also reinforces the effects of sympathetic nervous system. |
| **Q.109** | **B** | Secretion of testosterone from testes is under the control of ICSH. |
| **Q.110** | **C** | The level of thyroxin in the body is regulated by negative feedback mechanism between thyroid, hypothalamus and pituitary gland. |

# REPRODUCTION AND SUPPORT AND MOVEMENT

## Male Reproductive System & Female Reproductive System

**Q.1 It is an example of endocrine gland in male reproductive system:**
A. Testes
B. Seminal vesicle
C. Prostate gland
D. Bulbourethral gland

**Q.2 Glands that play main role in semen formation:**
A. Seminal vesicle
B. Prostate gland
C. Bulbourethral gland
D. Cowper's gland

**Q.3 Bulk of semen is produced by:**
A. Seminal vesicles
B. Bulbourethral gland
C. Prostate gland
D. Ejaculatory duct

**Q.4 Paired gonads in male are:**
A. Testes
B. Ovaries
C. Uterus
D. Scrotum

**Q.5 Pick a wrong statement about gonads in human males:**
A. Present outside body cavity
B. Protected by scrotum
C. Have more temperature than body
D. Consists of seminiferous tubules

**Q.6 Sertoli cells are found in:**
A. Ovaries and secret progesterone
B. Seminiferous tubules and provide nutrition to germ cells
C. Adrenal cortex and secrete adrenalin
D. Pancreas and secretes insulin

**Q.7 Which of the following is incorrectly matched regarding female reproductive organs?**
A. Ovaries-egg production
B. Oviduct-site of fertilization
C. Uterus-serves as birth canal
D. Cervix-distal end of uterus

**Q.8 Pick the correct combination of structures for given functions:**
A. Ovary (Fertilization), Oviduct (Conception), Uterus (Development)
B. Oviduct (Fertilization), Uterus (Conception), Uterus (Development)
C. Oviduct (Fertilization), Uterus (Conception), Cervix (Development)
D. Oviduct (Fertilization), Uterus (Conception), Vagina (Development)

**Q.9 The embryo is implanted and undergoes further development in:**
A. Ovary
B. Oviduct
C. Uterus
D. Cervix

**Q.10 Uterus is commonly known as:**
A. Birth canal
B. Oviduct
C. Womb
D. Female external genitalia

## Menstrual cycle, Sexually Transmitted Diseases

**Q.11 At the onset of puberty, FSH stimulates the development of _____ primary follicle/s.**
A. 1
B. 2
C. 4
D. Several

**Q.12 Peak level of progesterone is developed during:**
A. Follicular stage
B. Proliferative stage
C. Secretory stage
D. Menstrual stage

**Q.13 Stage of menstrual cycle that starts right after ovulation is:**
A. Menstrual
B. Follicular
C. Proliferative
D. Secretory

**Q.14 Progesterone secretion diminishes and its supporting effect on the spongy endometrium is reduced. This is related with:**
A. Formation of graffian follicle
B. Degeneration of corpus luteum
C. Rise in level of LH
D. Implantation of zygote

**Q.15 On an average, menstruation stage lasts for about _____ days:**
A. 2
B. 4
C. 14
D. 10

**Q.16 Which of the following is not a function of estrogen?**

A. Thickening of endometrium
B. Vascularization of wall of uterus
C. Inhibition of FSH secretion
D. Inhibition of LH secretion

**Q.17 AIDS is caused by:**

A. Bacteria
B. Virus
C. Fungi
D. Alga

**Q.18 Sexual contact is source of dissemination of all diseases except:**

A. Herpes simplex
B. Gonorrhea
C. AIDS
D. Syphilis

**Q.19 Major source of dissemination of syphilis is:**

A. Blood transfusion
B. Insect bite
C. Contaminated water
D. Sexual contact

**Q.20 In vitro fertilization is a technique that involves transfer of which one the following into the fallopian tube?**

A. Either zygote or early embryo up to 8 cell stage
B. Embryo only up to 8 cell stage
C. Embryo of 32 cell stage
D. Zygote only

## Human Skeleton (Bone and Cartilage)

**Q.21 Bone marrow is involved in all except:**

A. Production & maturation of RBCs
B. Production & maturation of all WBCs
C. Production of platelets
D. Release of RBCs in blood

**Q.22 It provides an attachment site for a muscle:**

A. Compact bone
B. Spongy bone
C. Hyaline cartilage
D. Fibrocartilage

**Q.23 Osteoblasts after conversion form:**

A. Osteocytes
B. Osteoclasts
C. Stem cells
D. Chondrocytes

**Q.24 Epiglottis is:**

A. Muscular
B. Cartilaginous
C. Fibrous
D. Bony

**Q.25 Large bone cells that enzymatically break down bone tissue:**

A. Osteocytes
B. Osteoblast
C. Osteoclast
D. Chondrocytes

**Q.26 Ends of long bones are covered by:**

A. Tendons
B. Ligaments
C. Cartilage
D. Muscles

**Q.27 Cartilage performs all functions except:**

A. Attachment of muscles with bones
B. Formation of external pinnae of ear
C. Covers ends of bones in joints
D. Covers glottis during swallowing

**Q.28 The collagen fibers of bones are hardened by deposit of:**

A. Calcium phosphate
B. Calcium nitrate
C. Calcium chloride
D. Calcium sulphate

**Q.29 Bone and cartilage are types of:**

A. Soft connective tissue
B. Special type of connective tissue
C. Rigid connective tissue
D. Rigid and soft connective tissue respectively

**Q.30 Bone matrix is hardened by:**

A. Haversian canals
B. Canaliculi
C. Bone marrow tissue
D. Calcium phosphate

## Joints, Comparison of Muscles Types, Disorder of Human Skeleton

**Q.31 Joints that fix teeth into the jaws are:**

A. Fibrous joints
B. Primary cartilaginous joints
C. Secondary cartilaginous joints
D. Synovial joints

**Q.32 Movement possible on pivot joint is:**

A. Flexion
B. Rotation
C. Extension
D. No movement allowed

**Q.33 Sutures (Joints of skull) are examples of:**

A. Immovable joints
B. Slightly moveable joints
C. Freely moveable joints
D. Synovial joints

**Q.34 Movements with precision and accuracy can be performed by:**

A. Skeletal muscles
B. Cardiac muscles
C. Smooth muscles
D. All A, B, C

**Q.35 Speed of contraction is slow to rapid in case of:**

A. Smooth muscles
B. Cardiac muscles
C. Skeletal muscles
D. All A, B, C

**Q.36 Type of muscles which have regular striations and voluntary control are:**

A. Smooth muscles
B. Cardiac muscles
C. Skeletal muscles
D. All A, B, C

**Q.37 Major constituent of muscle is:**

A. Fats
B. Minerals
C. Proteins
D. Carbohydrates

**Q.38 All of the following are causes of osteomalacia except:**

A. Estrogen deficiency
B. Calcium deficiency
C. Vitamin D Deficiency
D. Poor exposure to sunlight

**Q.39 A mass of clotted blood formed at fracture site is called:**

A. Soft callus
B. Hematoma
C. Bony callus
D. Oedema

**Q.40 Final structure of remodeled area resembles that of the original unbroken bone because it responds to the same set of _____stimuli.**

A. Chemical
B. Mechanical
C. Hormonal
D. Electrochemical

## Structure and Ultra-stucture of Skeletal Muscles, Sliding Filament Model and Energy for Muscle Contarction

**Q.41 Skeletal muscle fibers in humans contain all except:**

A. Multiple nuclei
B. Multiple mitochondria
C. Large amount of myoglobin
D. Large amount of hemoglobin

**Q.42 Each dark band in skeletal muscle has a lighter strip in its midsection called:**

A. A band
B. I band
C. H zone
D. Z line

**Q.43 The T-tubule and sarcoplasmic reticulum form:**

A. Muscle fiber
B. Triad
C. T system
D. Z disc

**Q.44 Site for attachment of calcium ions is present on:**

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

**Q.45 An action potential in a muscle fiber causes the release of calcium ions from:**

A. Actin filaments
B. Sarcoplasm
C. Sarcolemma
D. Sarcoplasmic reticulum

**Q.46 At the start of a muscle contraction, calcium ions are released from:**

A. Actin
B. Motor neuron
C. T tubule
D. Sarcoplasmic reticulum

**Q.47 When ATP are not available, contractures are developed because cross bridges are:**

A. Unable to attach
B. Unable to detach
C. Unable to develop
D. Unable to contract

**Q.48 In skeletal muscle under anaerobic conditions, ATP can be generated by:**

A. Glycolysis
B. Krebs cycle
C. Pyruvic acid oxidation
D. Respiratory chain

**Q.49 It is an energy storing protein in skeletal muscles:**

A. Myoglobin
B. Creatine phosphate
C. ATP
D. Glycogen

**Q.50 Bones at joints are held together by:**

A. Muscles
B. Ligaments
C. Tendons
D. Cartilage

**Q.51 All of the following bones are involved in RBCs production in adults except:**

A. Sternum
B. Ribs
C. Vertebrae
D. Femur

**Q.52 All of the following are the functions of endoskeleton in humans except:**

A. Protection
B. Support
C. Mineral homeostasis
D. Temperature homeostasis

**Q.53 Blood vessels do not penetrate in:**

A. Compact bone
B. Spongy bone
C. Cartilage
D. Muscle

**Q.54 It is an example of synovial joint:**

A. Joints of skull
B. Vertebral joints
C. Elbow joint
D. Symphysis pubis

**Q.55 Pick an incorrect statement about synovial joint:**

A. Surrounded by a fibrous capsule
B. Outer most layer is synovium
C. Friction reduction by fluid
D. Always freely movable

**Q.56 Joint formed by distal end of femur is:**

A. Ball and socket joint
B. Pivot joint
C. Hinge joint
D. Fibrous joint

**Q.57 Which types of muscles are found in ureters?**

A. Cardiac muscles
B. Smooth muscles
C. Skeletal muscles
D. Striped muscles

**Q.58 All of the following are examples of skeletal muscles except:**

A. Papillary muscles
B. Calf muscles
C. Brachialis
D. Tongue muscles

**Q.59 Muscles that are associated with movement of bones are:**

A. Smooth muscles
B. Cardiac muscles
C. Skeletal muscles
D. All A, B, C

**Q.60 Multinucleated cells are characteristic of:**

A. Smooth muscles
B. Skeletal muscles
C. Cardiac muscles
D. None of these

**Q.61 The thick filament is composed of:**

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

**Q.62 Thick and thin filaments during contraction are linked together through:**

A. Troponin
B. Tropomyosin
C. Calcium ions
D. Cross bridges

**Q.63 Each muscle is enclosed by a sheath called:**

A. Epimysium
B. Sarcolemma
C. Perimysium
D. Endomysium

**Q.64 Each muscle bundle contains all except:**

A. Many muscle fibers
B. Many motor units
C. Many neuronal connections
D. Many muscles bellies

**Q.65 Twisting around the actin chains, there are two strands of another protein called:**

A. Myoglobin
B. Myosin
C. Troponin
D. Tropomyosin

**Q.66 All of the following changes occur during muscle contraction except:**

A. Z lines become close
B. H zone disappears
C. A band become short
D. Overlapping increases

**Q.67 Sarcoplasmic reticulum most closely resembles with:**

A. Rough endoplasmic reticulum
B. Smooth endoplasmic reticulum
C. Golgi apparatus
D. Lysosomes

**Q.68 It is a muscle protein that acts as store for energy:**

A. Myoglobin
B. ATP
C. Creatine-$PO_4$
D. Creatinine-$PO_4$

**Q.69 At rest (after vigorous exercise), _____ accumulated lactic acid is broken aerobically**

A. 1/5th
B. 2/5th
C. 3/5th
D. 4/5th

**Q.70 Immediate source of energy for muscle contraction among the following is:**

A. Myoglobin
B. Creatine phosphate
C. ATP
D. Glycogen

**Q.71 When muscles are used actively, they:**

A. Increase in size
B. Become more efficient
C. Become fatigue resistant
D. All A, B, C

**Q.72 Part of muscle that is able to contract is:**

A. Origin
B. Insertion
C. Tendon
D. Belly

**Q.73 Final step of bone repairing is:**

A. Hematoma formation
B. Remodeling
C. Soft Callus Formation
D. Bony Callus Formation

**Q.74 The ring of annulus fibrosis contains:**

A. Osteocyte
B. Osteoblast
C. Osteoclast
D. Chondrocyte

**Q.75 Which of the following that does not involve respiratory tract?**

A. Tetany
B. Cramps
C. Lockjaw
D. Tetanus

**Q.76 _____ is an injury of a ligament.**

A. Strain
B. Sprain
C. Fracture
D. Stress

**Q.77 Acute sprain can be treated by all of the following except:**

A. Heat therapy
B. Ice-therapy
C. Dressings
D. Ace-wraps

**Q.78 It is also called as urinogenital duct in humans:**

A. Ureter
B. Vas deferens
C. Oviduct
D. Urethra

**Q.79 Plasma membrane of Sertoli cells contain receptors for:**

A. Estrogen
B. Oxytocin
C. FSH
D. LH

**Q.80 In humans, testes are present outside the body in a sac like structure called:**

A. Peritoneum
B. Cervix
C. Scrotum
D. Pelvis

**Q.81 After sperms production, they are first delivered to:**

A. Sperm duct
B. Seminal vesicles
C. Epididymis
D. Vas deference

**Q.82 Which of the following is not a male sex accessory gland?**

A. Seminal vesicle
B. Prostate
C. Epididymis
D. Bulbourethral

**Q.83 In which part of female reproductive system fertilization takes place?**

A. Proximal part of oviduct
B. Uterus
C. Placenta
D. Vagina

**Q.84 Egg is first released from ovary into:**

A. Oviduct
B. Uterus
C. Cervix
D. Body cavity

**Q.85 Birth canal is another name used for:**

A. Oviduct
B. Uterus
C. Cervix
D. Vagina

**Q.86 Urethra and vagina have independent openings to the exterior in:**

A. Male only
B. Female only
C. Both male & female
D. Neither male nor female

**Q.87 Implantation of fertilized egg in the uterus takes place under the influence of:**

A. FSH
B. Oxytocin
C. Progesterone
D. LH

**Q.88 Events of menstrual cycle are regulated by:**

A. Pituitary gonadotrophins
B. Placental gonadotrophins
C. Chorionic gonadotrophins
D. Paternal gonadotrophins

**Q.89 All of the following actions are stimulated by estrogen except:**

A. Proliferation of endometrium
B. Vascularization of endometrium
C. Secretion of FSH
D. Secretion of LH

**Q.90 Menstrual stage usually lasts for:**

A. 1-2 day
B. 3-7 days
C. 10-14 days
D. 24-28 days

**Q.91 All of the following actions are stimulated by FSH except:**

A. Development of primary follicle
B. Development of primary oocyte
C. Release of estrogen
D. Release of progesterone

**Q.92 Follicle cells after ovulation are modified to form:**

A. Primary follicles
B. Sertoli cells
C. More ova
D. Corpus luteum

**Q.93 Which hormone in females stimulates progesterone production?**

A. FSH
B. Prolactin
C. LH
D. Estrogen

**Q.94 In a reproductive cycle of 30 days, the day of ovulation will be:**

A. 12th day
B. 14th day
C. 16th day
D. 18th day

**Q.95 All of the following are viral STDs except:**

A. Herpes simplex
B. Genital herpes
C. Syphilis
D. AIDS

**Q.96 It is a viral STD in which immune system is collapsed:**

A. Genital herpes
B. AIDS
C. Syphilis
D. Gonorrhoea

**Q.97 Which of the following STD can be cured by using antibiotics?**

A. Genital herpes
B. AIDS
C. Syphilis
D. Influenza

**Q.98 Genital herpes is caused by herpes simplex:**

A. Type I
B. Type II
C. Type III
D. Type IV

**Q.99 Which of the following STDs can be cured by use of antibiotics?**

A. Gonorrhea & syphilis
B. Syphilis & genital herpes
C. Genital herpes & AIDS
D. Gonorrhea & genital herpes

**Q.100 Which technique involves fertilization outside the body of the female?**

A. Intrauterine fertilization
B. In vitro fertilization
C. In vivo fertilization
D. Ex vivo fertilization

## ANSWERS & EXPLANTION: -

**Q.1** **A**

| Gland | Secretion |
|---|---|
| Testes | Testosterone |
| Seminal vesicles | Alkaline secretions |
| Prostate gland | Milky secretion containing enzymes |
| Bulbourethral gland | Mucus |

**Q.2** **A**

| Production | site | Contribution in semen |
|---|---|---|
| Spermatozoa | Testes | 2-5% |
| Seminal | vesicles | 60% |
| Prostate fluid | Prostate gland | 30% |
| Mucus | Bulbourethral gland | 5% |

**Q.3** **A**

| Production | site | Contribution in semen |
|---|---|---|
| Spermatozoa | Testes | 2-5% |
| Seminal | vesicles | 60% |
| Prostate fluid | Prostate gland | 30% |
| Mucus | Bulbourethral gland | 5% |

**Q.4** **A** Uterus and ovaries are the parts of female reproductive system.

**Q.5** **C** Male gonads are located in a sac like scrotum which is meant for thermoregulation as sperm production requires a lower temperature than core body.

**Q.6** **B** Protection and nourishment to sperms inside testes is provided by nurse (sertoli) cells.

**Q.7** **C**

| Proximal part of oviduct | (Site of fertilization) |
|---|---|
| Ovary | (Site of oogenesis) |
| Uterus | (Site of implantation of embryo and development) |
| Vagina | (Birth canal) |

**Q.8** **B** Sperm fertilizes egg in the proximal part of oviduct where zygote forms which then starts division and is implanted in endometrium where it completes development.

**Q.9** **C** Sperm fertilizes egg in the proximal part of oviduct where zygote forms which then starts division and becomes embryo and is implanted in endometrium where it completes development.

**Q.10** **C** The implantation of embryo and further development takes place in womb.

**Q.11** **D** Only one follicle among several developing follicles mature under the action of FSH whereas others are degraded by a process called as follicle atresia.

**Q.12** **C** During menstrual cycle progesterone is produced from corpus luteum.

**Q.13** **D** Ovulation occurs at the end of proliferative or follicular phase. Menstruation occurs at the end of secretory phase.

**Q.14** **B** Secretion of progesterone during menstrual cycle is maintained by corpus luteum which forms after ovulation.

**Q.15** **B** Duration of menstrual cycle ranges from 3 to 7 days.

**Q.16** **D** Estrogen is produced by ripening follicles in proliferative phase and it acts on endometrium. It also stimulates ovulation by its feedback mechanism.

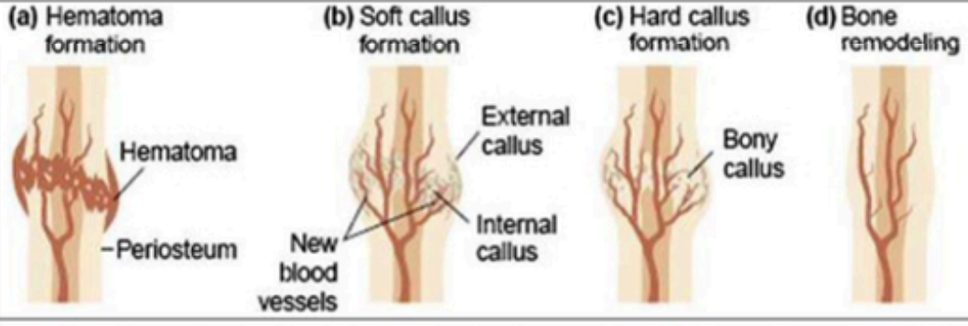
**Q.17** **B** Causative agent of AIDS is HIV.

**Q.18** **A** Sexual contact is the main transmission source of sexually transmitted diseases.

**Q.19** **D** Syphilis is a sexually transmitted disease.

**Q.20** **A** Fertilized eggs known as pre-embryos are transferred back into the uterus. In this, the zygote or early embryos up to 8-cell stage are transferred into the fallopian tube.

| | | |
|---|---|---|
| **Q.21** | **B** | Haemopoeitic stem cells in bone marrow give rise to all blood cells. T lymphocytes mature in thymus. |
| **Q.22** | **A** | Muscles are attached to bones and spongy bone is buried deep inside the compact bone thus unavailable for attachment. |
| **Q.23** | **A** | Osteoclasts are bone dissolving cells whereas chondrocytes are cartilage forming cells. Mature bone cells are formed from osteoblasts. |
| **Q.24** | **B** | Epiglottis is elastic in nature and softer than bone. |
| **Q.25** | **C** | Bone consists of three types of cells:<br>• Osteoblast Bone forming cells.<br>• Osteoclast Bone dissolving cells.<br>• Osteocytes Mature bone cells. |
| **Q.26** | **C** | Ends of long bones usually form joints, that's why their ends must be covered with smooth nonresistant material to avoid friction. |
| **Q.27** | **A** | Tendons are meant to connect bones with muscles. |
| **Q.28** | **A** | Bones are reservoirs of minerals like calcium and phosphate. |
| **Q.29** | **C** | Tissues use to connect, support or bind other tissues or organs. |
| **Q.30** | **D** | The collagen fibres of most rigid connective tissue of our body are hardened by deposit of calcium phosphate. |
| **Q.31** | **A** | Bones must in close contact with each other. |
| **Q.32** | **B** | Flexor is a part and parcel of extensor that allows 180o movement. |
| **Q.33** | **A** | These are least moveable joints. |
| **Q.34** | **A** | Precise and accurate movements can be brought about by muscles that are under our control. |
| **Q.35** | **C** | Muscles without rhythmicity and in our control. |
| **Q.36** | **C** | Voluntarily controlled muscles having regular striations are also multinucleated and unbranched. |
| **Q.37** | **C** | Muscle fiber is made up of thick and thin filaments, which have contractile property. |
| **Q.38** | **A** | **Osteomalacia** refers to a marked softening of your bones, most often caused by severe vitamin D deficiency while osteoporosis is caused by estrogen deficiency. |
| **Q.39** | **B** | **Hematoma** is generally defined as a collection of blood outside of blood vessels. |
| **Q.40** | **B** | Remolded bones behave and respond to mechanical or physical stimuli just like original bone. |
| **Q.41** | **D** | Hemoglobin is found in red blood cells. |
| **Q.42** | **C** | Dark band is a little bright in the middle where only thick filaments are present |
| **Q.43** | **B** | • Hollow elongated tubes penetrating the cell, formed by invagination of sarcolemma.<br>• These are continuous with extracellular fluid, also related with sarcoplasmic reticulum to form a triad.<br>• All the T- tubules of each muscle cell are collectively called T- System. |
| **Q.44** | **B** | Tropomyosin and actin are attached with one another and second attachment is with troponin and no more site is available for attachment to calcium. |
| **Q.45** | **D** | Sarcoplasmic reticulum releases calcium ions in sarcoplasm and these ions bind with troponin to start sliding of filament. |
| **Q.46** | **D** | Sarcoplasmic reticulum upon stimulation releases calcium ions into cytosol which then binds with Troponin. |

| | | |
|---|---|---|
| **Q.47** | **B** | No energy is required to establish cross bridges however ATP is required to break the cross bridges. |
| **Q.48** | **A** | Continuous supply of ATP can only be made possible by short and effective set of reactions without consuming much time. |
| **Q.49** | **B** | ATP is not a protein. |
| **Q.50** | **B** | Connective tissue that attaches muscle with bone is tendon. |
| **Q.51** | **D** | Short bones contain red bone marrow, a site for RBCs production. |
| **Q.52** | **D** | Bones are the reservoirs of minerals. |
| **Q.53** | **C** | Bones and muscles have a tendency to get repaired therefore they must have blood supply.C |
| **Q.54** | **C** | It is an example of freely moveable joint |
| **Q.55** | **B** | Fibrous capsule is outer part and inner to this capsule is synovial membrane. |
| **Q.56** | **C** | Tibia forms joint with femur, that allows 180-degree movement. |
| **Q.57** | **B** | Involuntary and non-striated muscles are found in walls of ureters. |
| **Q.58** | **A** | Muscles that are found in heart are involuntary. |
| **Q.59** | **C** | Skeleton along with muscle helps in our movement. |
| **Q.60** | **B** | Smooth muscle cells are uninucleate, cardiac muscles have one nucleus per cell and skeletal muscle cells are multinucleated. |
| **Q.61** | **B** | Actin is regarded as thin filament and it also contains two polypeptides. |
| **Q.62** | **D** | Calcium ion helps to unveil the active site for the attachment of actin and myosin head. |
| **Q.63** | **A** | Sarcolemma is plasma membrane of muscle cell which join to form muscle bundles. Muscle bundles are covered by perimysium. Muscle bundles join to form muscle which is enclosed by epimysium |
| **Q.64** | **D** | Many muscle bundles collectively form a single muscle and it results in a single belly. |
| **Q.65** | **D** | Myosin is not twisted around actin and troponin is a three-polypeptide complex. |
| **Q.66** | **C** | Sliding requires one participant to stay static while the other has to slide (I band). |
| **Q.67** | **B** | Nerve impulse conduction and have no ribosome attached with it |
| **Q.68** | **C** | Creatinine is a product of creatine-$PO_4$ |
| **Q.69** | **A** | 4/5th is converted back into glucose for normal breakdown. |
| **Q.70** | **C** | Creatine phosphate is a secondary source of energy. |
| **Q.71** | **D** | Muscular activity upgrades muscle tone and blood supply |
| **Q.72** | **D** | Origin and insertion are to hold muscles with bones. |
| **Q.73** | **C** |  |
| **Q.74** | **D** | The **annulus fibrosus** is the tough circular exterior of the intervertebral disc made up of fibrocartilage. All types of cartilage contain living chondrocytes. |

| | | |
|---|---|---|
| **Q.75** | **B** | A muscle cramp is a strong, painful contraction or tightening of a muscle that comes on suddenly and lasts from a few seconds to several minutes. |
| **Q.76** | **B** | Sprain is twisting the ligaments of (an ankle, wrist, or other joint) violently so as to cause pain and swelling but not dislocation. |
| **Q.77** | **A** | Applying **heat** too early may cause additional swelling by increasing blood flow to the ligamentous **injury**. |
| **Q.78** | **D** | In human males sperms are carried to outside by urethra. Urinogenital duct is named so because it carries urine and sperm outside the body. |
| **Q.79** | **C** | Sertoli cells produce secretions for protection and nourishment to sperms under the influence of a gonadotrophic hormone (FSH). |
| **Q.80** | **C** | Along with protection, scrotum also plays very important role in maintaining an optimum temperature for sperm production which is slightly lower than the core body temperature. |
| **Q.81** | **C** | Seminiferous tubules (sperm production) → Epididymis→ vas deferens→ ejaculatory duct→ urethra |
| **Q.82** | **C** | Duct system associated with testes is not considered as associated organs. |
| **Q.83** | **A** | **Proximal part of oviduct** — **(Site of fertilization)**<br>Ovary — (Site of oogenesis)<br>Uterus — (Site of implantation of embryo and development)<br>Vagina — (Birth canal) |
| **Q.84** | **D** | Ovary is not physically connected to oviduct. Movement of oviducts' fimbriae helps the egg released from ovary to enter oviduct. |
| **Q.85** | **D** | Birth canal is the structure of female reproductive system which provides a passage for the deli very of fetus. |
| **Q.86** | **B** | Urethra and vagina are part of female reproductive system only. Male has urinogenital duct. |
| **Q.87** | **C** | Implantation of zygote in uterus is facilitated by thickness and vascularity in endometrium. |
| **Q.88** | **A** | The proliferation of endometrium and release of ovum is under the control of FSH and LH. |
| **Q.89** | **C** | Estrogen is produced by ripening follicles and it acts on endometrium. It gives negative feedback to FSH and positive feedback to LH. |
| **Q.90** | **B** | On average menstrual stage lasts for 4 days |
| **Q.91** | **D** | On puberty FSH acts on several primary follicles which develop and start releasing estrogen. Progesterone is produced from ruptured follicles. |
| **Q.92** | **D** | LH causes rupturing of Graafian follicle which causes the release of ovum. |
| **Q.93** | **C** | Progesterone is produced by Corpus luteum which is formed by ruptured follicles after ovulation. |
| **Q.94** | **C** | After ovulation, secretory phase starts which is constant and lasts for 14 days. |
| **Q.95** | **C** | A spirochete, *Treponema pallidum*, causes syphilis. |
| **Q.96** | **B** | HIV is transmitted by sexual contact and effects immune system by destroying helper T lymphocytes. |
| **Q.97** | **C** | Antibiotics are used against bacterial infections. |
| **Q.98** | **B** | HSV I causes oral herpes. |
| **Q.99** | **A** | Antibiotics are used against bacterial infections. |
| **Q.100** | **B** | In vitro fertilization is also famously known as IVF. It is an art used to carry out fertilization outside the body of the female. |

## BIODIVERSITY/ACELLULAR LIFE/VIRUSES & PROKARYOTES/BACTERIA

### Discovery, Structure & Classification of viruses

**Q.1** **Who discovered that the agents which caused tobacco mosaic disease were filterable?**
A. Louis Pasteur
B. Charles Chamberland
C. Ivanowski
D. Stanley

**Q.2** **First virus which was purified and crystallized was:**
A. Pox virus
B. Tobacco mosaic virus
C. Rabies virus
D. Bacteriophage

**Q.3** **These are non-cellular infectious entities which contain either RNA or DNA:**
A. Viroids
B. Prions
C. Viruses
D. Pathogens

**Q.4** **It gives definite shape to the virion:**
A. DNA
B. RNA
C. Capsid
D. Envelope

**Q.5** **Viruses are:**
A. Facultative intercellular parasites
B. Obligate intercellular parasites
C. Facultative intracellular parasites
D. Obligate intracellular parasites

**Q.6** **Chemically viruses are:**
A. Nucleo-histone
B. Ribonucleoprotein
C. Nucleoprotein
D. Glycoprotein

**Q.7** **Number of capsomeres in capsid of herpes virus is:**
A. 152
B. 162
C. 252
D. 262

**Q.8** **It is the essential component of all the viruses:**
A. Nucleocapsid
B. Envelope
C. Head
D. Tail

**Q.9** **A chemical component that is found in all viruses is:**
A. RNA
B. DNA
C. Lipid
D. Protein

**Q.10** **The most common classification for viruses is on base of:**
A. Host
B. Morphology
C. Nucleic acid properties
D. Envelop

### Bacteriophages (Structure and Life Cycle), Viral diseases & HIV and AIDS

**Q.11** **Bacteriophages are similar to fungi:**
A. In having cell wall
B. In having RNA as genetic material
C. Mode of reproduction
D. In having DNA as genetic material

**Q.12** **The common host for $T_4$ phage is:**
A. Mycoplasma
B. Pneumococcus
C. Escherichia coli
D. Vibrio cholera

**Q.13** **The phage which causes lysis of the host cell is known as:**
A. Temperate phage
B. Lysogenic phage
C. Virulent phage
D. Non-virulent phage

**Q.14** **Penetration of bacteriophage into bacterial cell is mainly due to lysozyme. This enzyme breaks bonds in:**
A. Proteins of capsule
B. Peptidoglycan of cell wall
C. Polysaccharides of slime
D. Lipoproteins of cell membrane

**Q.15** **It is also called as infusion hepatitis:**
A. Hepatitis A
B. Hepatitis B
C. Hepatitis C
D. Hepatitis D

**Q.16** **Acute attacks of hepatitis B cause:**
A. Insomnia, chronic liver disease
B. Fatigue, loss of appetite and jaundice
C. Loss of immune functions
D. Loss of immune functions

**Q.17 Which phenomenon of HIV life cycle occurs in host nucleus?**

A. Penetration
B. Reverse transcription
C. Assembly
D. Integration

**Q.18 All of the following chemical components are found in mature HIV except:**

A. RNA
B. Lipids
C. Proteins
D. DNA

**Q.19 Which process or step in HIV life cycle does not occur in cytoplasm?**

A. Uncoiling
B. Reverse transcription
C. Transcription
D. Assembly

**Q.20 An AIDS patient can suffer from:**

A. Immune deficiency
B. Tumor production
C. Opportunistic infections
D. All A, B, C

## Bacteria (Size and Shape), Bacterial Cell Structures

**Q.21 What is true about pleomorphic bacteria?**

A. All are autotrophs
B. Have spherical shape
C. Only seen in one shape
D. Exist in variety of shapes

**Q.22 It is a cube of eight cocci with three planes of division:**

A. Tetrad
B. Sarcina
C. Streptococcus
D. Staphylococcus

**Q.23 The smallest known bacteria are:**

A. Mycoplasma
B. E. coli
C. Spirochete
D. Pneumococci

**Q.24 Bacilli are rod shaped bacteria and divide in:**

A. One plane
B. Two planes
C. Three planes
D. Random planes

**Q.25 The smallest known bacterium is without:**

A. Cell wall
B. Cytoplasmic matrix
C. DNA
D. Ribosomes

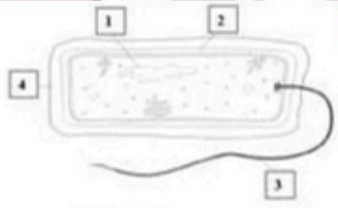
**Q.26 It determines shape of bacterium:**

A. Cell membrane
B. Cell wall
C. Capsule
D. Slime

**Q.27 Cell wall of archaebacteria does not contain:**

A. Proteins
B. Peptidoglycan
C. Glycoproteins
D. Polysaccharides

**Q.28 Following is the diagram of bacteria, identify the structure from 1 to 4:**




A. 1: Chromatin body, 2: Cell wall, 3: Flagella, 4: Capsule
B. 2: Chromatin body, 1: Cell wall, 4: Flagella, 3: Capsule
C. 4: Chromatin body, 2: Cell wall, 1: Flagella, 3: Capsule
D. 1: Chromatin body, 2: Cell wall, 4: Flagella, 3: Capsule

**Q.29 Strengthening material of bacterial cell wall is:**

A. Cutin
B. Murein
C. Sterol
D. Lignin

**Q.30 Bacterial cell wall is responsible for:**

A. Respiratory metabolism
B. Control of transport
C. Prevention of osmotic lysis
D. Formation of mesosomes

## Bacterial Cell Structures, Importance and control of bacteria

**Q.31 These bacteria very rarely have flagella:**

A. Cocci
B. Bacilli
C. Spirilla
D. Spirochete

**Q.32 These are more resistant to unfavorable environmental conditions as compared to others:**

A. Capsule
B. Spore
C. Cyst
D. Plasmid

**Q.33 Outer membrane is found in _____ and made of _____.**

A. Gram+ve, Lipo-proteins
B. Gram+ve, Lipo-polysaccharides
C. Gram-ve, Lipo-proteins
D. Gram-ve, Lipo-polysaccharides

**Q.34 CV-I complex is retained during Gram staining in:**

A. Mycoplasmas
B. Gram positive
C. Gram negative
D. Archeobacteria

**Q.35 A cell wall component that is absent in gram negative bacteria:**

A. Lipopolysaccharides
B. Lipoprotein
C. Peptidoglycan
D. Techoic acid

**Q.36 It causes destruction of all life forms:**

A. Sterilization
B. Disinfection
C. Antisepsis
D. Immunization

**Q.37 Chemical substances used on living tissues that inhibit growth of microorganisms are called:**

A. Preservatives
B. Antiseptics
C. Disinfectants
D. Vaccines

**Q.38 Dry heat causes killing of germs by:**

A. Coagulation of their proteins
B. Neutralization of their toxins
C. Oxidation of their chemicals
D. Inhibition of their enzymes

**Q.39 Heat sensitive compounds like antibiotics, seras & hormones can be sterilized by means of:**

A. Moist heat
B. Radiations
C. Membrane filters
D. Antiseptics

**Q.40 Halogens, phenols, hydrogen peroxide and potassium permanganate are examples of:**

A. Preservatives
B. Disinfectants
C. Antiseptics
D. Chemotherapeutic agents

**Q.41 First vaccine was developed by Edward Jenner against:**

A. Cow pox
B. Small pox
C. Tuberculosis
D. Cholera

**Q.42 Members of which of the following group are all parasites?**

A. Viruses
B. Bacteria
C. Fungi
D. Protozoa

**Q.43 Which of the following disease is caused by prions?**

A. Glycogenosis type II disease
B. Mysterious brain infection
C. Multiple sclerosis
D. Cholecystitis

**Q.44 The complete, mature and infectious viral particle is known as:**

A. Venom
B. Virion
C. Viroid
D. Prion

**Q.45 All of the following viral components are synthesized in host cell by using its metabolic machinery except:**

A. DNA
B. RNA
C. Capsid
D. Envelope

**Q.46 Viruses are extremely small infectious agents, which can only be seen by:**

A. Naked eye
B. Light microscope
C. Compound microscope
D. Electron microscope

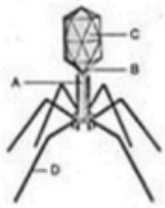
**Q.47 Tobacco mosaic virus is:**

A. Tadpole like
B. Rod shaped
C. Spherical
D. Hexagonal

**Q.48 Genome of T4 bacteriophage contains:**

A. Single stranded DNA
B. Double stranded DNA
C. Single stranded RNA
D. Double stranded RNA

**Q.49 What is indicating A to D in this figure?**




A. A–Collar, B–Tail Fibres, C–Head, D–Sheath
B. A–Sheath, B–Collar, C–Head, D–Tail fibres
C. A–Tail fibres, B–Sheath, C–Collar, D–Head
D. A–Tail fibres, B–Collar, C–Head, D–Sheath

**Q.50 Receptor site for attachment of T4 phage is present on:**

A. Cell wall of *E. coli*
B. CD 4 site of *E. coli*
C. CD 4 site on helper T-cell
D. Cell membrane of *E. Coli*

**Q.51 Lysozyme breaks the bonds in _____ part of bacterial cell:**

A. Cell membrane
B. Cell wall
C. Capsule
D. Slime

**Q.52 In lysogenic cycle, the DNA of the bacteriophage:**

A. Joins the bacterial chromosome
B. Joins the bacterial plasmid
C. Is immediately degraded when enter
D. Attached with the ribosome

**Q.53 A prophage that leads to daughter bacterial cells with viral infection is:**

A. Virulent phage
B. Inductive phage
C. Temperate phage
D. Lytic phage

**Q.54 This is not true about capsid of head of T4 phage:**

A. It consists of proteins
B. It contains genetic information
C. It contains lysozyme
D. It is pyramidal in shape

**Q.55 What are the sequence of steps in which a bacteriophage attacks bacterium and injects its DNA?**

A. Landing → Tail contraction → Penetration → DNA injection
B. Penetration → Landing → Tail contraction → DNA injection
C. Tail contraction → Landing → DNA injection → Penetration
D. Landing → Penetration → Tail contraction → DNA injection

**Q.56 Capsid of polio virus is:**

A. Tubular
B. Pyramidal
C. Spherical
D. Hexagonal

**Q.57 Up to 60% of adults are immune to:**

A. Mumps and measles
B. Cowpox and measles
C. Influenza and herpes
D. Cowpox and small pox

**Q.58 It is less severe but often leads to chronic liver disease:**

A. Hepatitis A
B. Hepatitis B
C. Hepatitis C
D. Hepatitis E

**Q.59 It is the inflammation of liver:**

A. Jaundice
B. Hepatitis
C. Cirrhosis
D. Hepatomegaly

**Q.60 Retroviruses contain:**

A. Single stranded RNA
B. Single stranded DNA
C. Double stranded RNA
D. Double stranded DNA

**Q.61 HIV infects its host as a:**

A. Viroid
B. Prion
C. RNA
D. Virion

**Q.62 Which of the following cells are mainly infected by HIV?**

A. T-killer lymphocytes
B. T-helper lymphocytes
C. B-plasma cells
D. B-memory cells

**Q.63 All of the following parts of HIV enter into host cell except:**

A. RNA strands
B. Protein capsid
C. Reverse transcriptase
D. Envelope

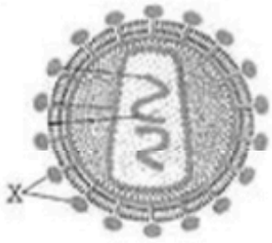
**Q.64 All of these are ways of transfer of HIV except:**

A. Blood
B. Placenta
C. Breast feeding
D. Saliva

**Q.65 By using vaccination, _____ disease cannot be controlled yet:**

A. Polio
B. AIDS
C. Measles
D. Mumps

**Q.66 Part of HIV labeled at X is:**




A. Envelope
B. Envelope spikes
C. Capsid
D. Genome

**Q.67 Bacteria which exist in variety of shapes are:**

A. Cocci
B. Bacilli
C. Spirochete
D. Pleomorphic

**Q.68 In given diagram the first one is coccus bacteria, second is most appropriately a:**

A. Bacillus
B. Coccobacillus
C. Sarcina
D. Pleomorphic

**Q.69 Which one is not a rod-shaped bacterium?**

A. *Escherichia coli*
B. *Hyphomicrobium*
C. *Bacillus subtilis*
D. *Pseudomonas*

**Q.70 One, which is not present in bacterial cells?**

A. Microtubules
B. Nucleoid
C. Cytosol
D. Glycogen

**Q.71 Bacterium shown here is:**

A. Monotrichous
B. Bitrichous
C. Amphitrichous
D. Lophotrichous

**Q.72 These are extremely thin, hair like appendages found in bacteria:**

A. Cilia
B. Flagella
C. Pili
D. Fimbrae

**Q.73 Bacterial flagella originate from:**

A. Cell wall
B. Cell membrane
C. Basal body
D. Cytoskeleton

**Q.74 In S Type Pneumococci, capsule is chemically made of:**

A. Protein only
B. Polysaccharide only
C. Polysaccharide and protein
D. Polysaccharide and lipid

**Q.75 Structure present in all bacteria is:**

A. Slime
B. Capsule
C. Cell Wall
D. Cell membrane

**Q.76 The plasma membrane and everything present within is known as:**

A. Intracellular matrix
B. Extracellular matrix
C. Protoplast
D. Cell envelope

**Q.77 It is not present in cytoplasmic matrix of bacteria?**

A. Mesosomes
B. Granules
C. Ribosomes
D. Microtubules

**Q.78 Bacterial cell is considered as:**

A. Haploid
B. Diploid
C. Triploid
D. Polyploid

**Q.79 Feulgen stain is used to dye bacterial:**

A. Cell wall
B. Cell membrane
C. Chromatin body
D. Plasmid

**Q.80 Feulgen stain is used in study of bacterial:**

A. DNA
B. Cell wall
C. Mesosomes
D. Storage bodies

**Q.81 Cytoplasmic matrix of bacterial cell contains:**

A. Nucleohistones
B. Cytoskeleton
C. Nucleolus
D. Plasmids

**Q.82 Bacterial cytoplasm lacks:**

A. Nucleoid
B. Plasmid
C. 80 S ribosomes
D. Mesosomes

**Q.83 Bacterial wastes include:**

A. Ethyl alcohol
B. Lactic acid
C. Acetic acid
D. All of these

**Q.84 These are only desiccation resistant structures:**

A. Capsule
B. Slime
C. Spore
D. Cyst

**Q.85 All of the following are true about cell wall of Gram-positive bacteria except:**

A. Thick peptidoglycan layer
B. Wide periplasmic space
C. Outer membrane present
D. More permeable

**Q.86 Antibiotic that inhibits the reproductive capacities of the microbes is called:**

A. Broad spectrum
B. Microbistatic
C. Microbicidal
D. Microbiological

**Q.87 Process which kills bacteria as well as spores is called:**

A. Immunization
B. Disinfection
C. Sterilization
D. Antisepsis

**Q.88 Literal meaning of antibiotics is:**

A. Against bacteria
B. Against antigens
C. Against life
D. Against biomass

**Q.89 Incorrect statement for antibiotic is:**

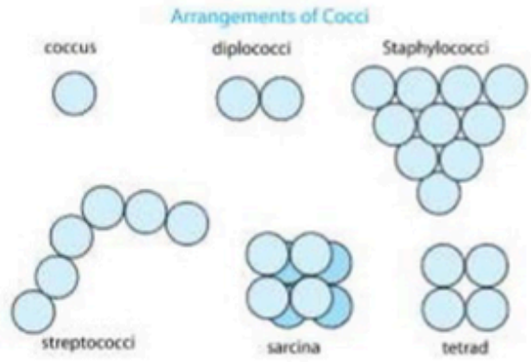
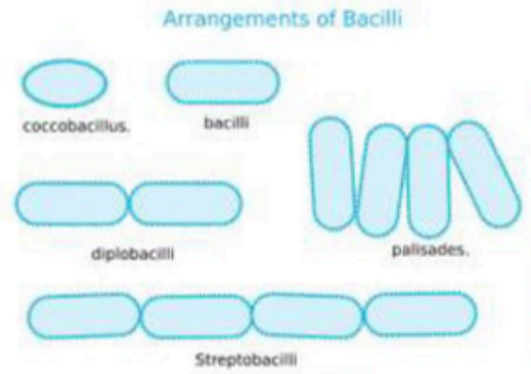
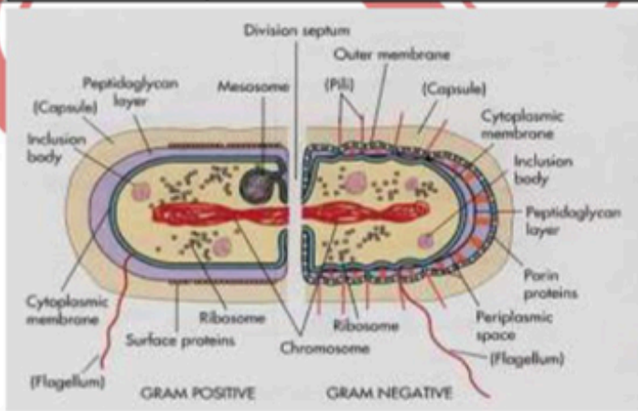
A. Its primary source is a living organism
B. It works along with immune system
C. It acts against all types of pathogens
D. It can produce side effects

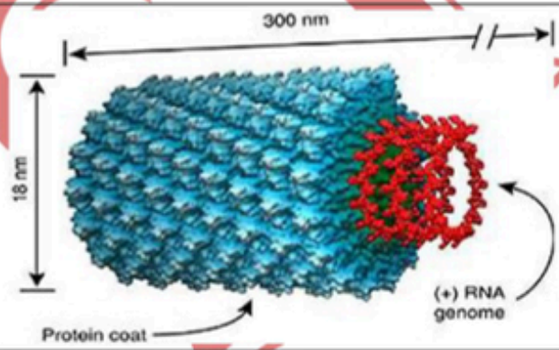
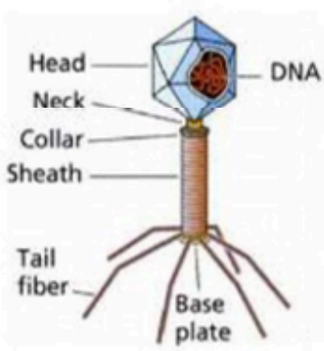
**Q.90 Antibiotics are synthesized and secreted by:**

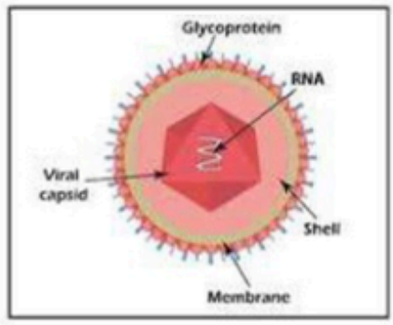
A. Bacteria
B. Actinomycetes
C. Fungi
D. All A, B, C

## ANSWERS & EXPLANTION: -

| | | |
|---|---|---|
| **Q.1** | **C** | Ivanowski discovered that viruses are filterable. Stanley was involved in crystallization of TMV. Charles Chamberland found that rabies virus can pass through porcelain filters. Louis Pasteur used the term vaccination. |
| **Q.2** | **B** | W.M.Stanley first time isolated, purified and crystallized TMV. |
| **Q.3** | **C** | Viroids contains only RNA, prions contain only proteins while pathogen is a broader term and can be used for any organism causing disease. |
| **Q.4** | **C** | Viruses are surrounded by protein coat called capsid. On base of capsid, viruses have two types of symmetry i.e. cubical or helical. |
| **Q.5** | **D** | • Viruses replicate only inside living host cell.<br>• Viruses are obligate and cannot be grown on artificial culture media. |
| **Q.6** | **C** | Viruses contain genome of nucleic acid and protein coat. |
| **Q.7** | **B** | 162 in herpes virus and 252 in adenovirus. |
| **Q.8** | **A** | Envelope, head and tail are not found in all viruses. |
| **Q.9** | **D** | Protein coat/ capsid is always present in all viruses while nucleic acid may be RNA or DNA. Similarly, lipids are only located in enveloped viruses in the form of composition of envelope (lipoprotein). |
| **Q.10** | **C** | On base of type of nucleic acid, viruses are classified into two main groups i.e. RNA and DNA viruses. |
| **Q.11** | **D** | Bacteriophage is DNA non-enveloped virus which reproduces only in bacteria and have similarity with fungi, both have DNA. |
| **Q.12** | **C** | Bacteriophages are specific for specific strains of bacteria. T4 phages attack on *E. coli.* |
| **Q.13** | **C** | It is also called as lytic or infectious phage. |
| **Q.14** | **B** | Peptidoglycan is the major portion of bacterial cell wall and lysozyme released by the tail of bacteriophage is used to dissolve a portion of cell wall. |
| **Q.15** | **C** | Hepatitis A was called as infectious hepatitis and hepatitis B as serum hepatitis. |
| **Q.16** | **B** | These are common symptoms of hepatitis. |
| **Q.17** | **D** | • Adsorption/ Attachment: Outside<br>• Uncoating, Reverse Transcription, Translation, Assembly: Cytoplasm<br>• Integration, Transcription: Nucleus |
| **Q.18** | **D** | HIV virus contains RNA in its genome and is known as RNA enveloped virus while envelope is derived from host cell membrane so it contains lipids too. |
| **Q.19** | **C** | Transcription in life cycle of HIV occurs in nucleus while uncoiling, reverse transcription and assembly occur in cytoplasm. |
| **Q.20** | **D** | In case of AIDS, immune system fails to protect host, so many opportunistic parasites get benefit and attack the host cells and HIV contain oncogene that convert normal cells into cancer (tumor). |
| **Q.21** | **D** | In microbiology, pleomorphism is the ability of some microorganisms to alter their morphology, biological functions or reproductive modes in response to environmental conditions. |

<table>
<tr><td>Q.22</td><td>B</td><td> 
</td></tr>
<tr><td>Q.23</td><td>A</td><td>Mycoplasma have a size of around 100-200 nm.</td></tr>
<tr><td>Q.24</td><td>A</td><td> 
</td></tr>
<tr><td>Q.25</td><td>A</td><td>Mycoplasma are smallest known bacteria and are without cell wall.</td></tr>
<tr><td>Q.26</td><td>B</td><td>Cell wall is rigid and provides shape to bacterial cells. Moreover, it also protects bacterial cells from osmotic lysis.</td></tr>
<tr><td>Q.27</td><td>B</td><td><table>
<tr><th>Eubacteria</th><th>Archaeobacteria</th></tr>
<tr><td>Peptidoglycan</td><td>Proteins, Glycoproteins, Polysaccharides</td></tr>
<tr><td>Eubacteria</td><td>have cell wall made of peptidoglycan.</td></tr>
</table></td></tr>
<tr><td>Q.28</td><td>A</td><td> 
</td></tr>
<tr><td>Q.29</td><td>B</td><td>Murein also called as peptidoglycan is main component of bacterial cell wall. Cutin and sterol are not found in any cell wall. Lignin is found in plant cell wall.</td></tr>
<tr><td>Q.30</td><td>C</td><td>Prevention of osmotic lysis is the function of cell wall.</td></tr>
<tr><td>Q.31</td><td>A</td><td>Cocci are mostly atrichous and non-motile.</td></tr>
<tr><td>Q.32</td><td>B</td><td>Cyst is only desiccation resistant while spore provides protection against multiple environmental conditions.</td></tr>
<tr><td>Q.33</td><td>D</td><td><table>
<tr><th></th><th>Gram positive bacteria</th><th>Gram negative bacteria</th></tr>
<tr><td>Additional substances</td><td>Teichoic acid and lipoteichoic acid</td><td>Lipopolysaccharides, lipoproteins</td></tr>
<tr><td>Outer membrane</td><td>No</td><td>Yes</td></tr>
</table></td></tr>
</table>

| | | |
|---|---|---|
| **Q.34** | **B** | Gram positive bacteria are stained purple with primary dye (Crystal violet & Gram's iodine) and retain the dye on treatment with alcohol. These stain forms CV-I complex which binds with peptidoglycan. |
| **Q.35** | **D** | Teichoic acid is a molecule found exclusively in gram-positive bacterial cell walls. It plays crucial roles in cell shape determination, regulation of cell division, and other fundamental aspects of gram-positive bacterial physiology. |
| **Q.36** | **A** | Sterilization involves use of physical agents. |
| **Q.37** | **B** | Disinfectants are used for non-living while antiseptic for living. |
| **Q.38** | **C** | Moist heat causes killing by coagulation while dry heat causes killing by oxidation. |
| **Q.39** | **C** | Filtration is most important method for such substances. |
| **Q.40** | **B** | Disinfection is the use of chemicals. Chemicals that are used to disinfect non-living are called disinfectants while for living are called antiseptic. All these are disinfectants. |
| **Q.41** | **B** | Small pox is a viral disease. Cowpox pus was used as vaccine. |
| **Q.42** | **A** | • Bacteria can be parasitic, saprotrophic, chemosynthetic, photosynthetic and symbiont.<br>• Fungi can be parasitic and saprotrophic.<br>• Protozoa can be parasite or free living |
| **Q.43** | **B** | • Glycogenosis type II disease is lysosomal storage disease.<br>• Multiple sclerosis involves demyelination of neurons.<br>• Cholecystitis is inflammation of gall bladder. |
| **Q.44** | **B** | • Venom is term used for poison.<br>• Viroid is infectious RNA.<br>• Prion is infectious protein. |
| **Q.45** | **D** | Virus takes host membrane as envelope. |
| **Q.46** | **D** | Range of size of viruses is 20-250 nm. |
| **Q.47** | **B** |  |
| **Q.48** | **B** | T4 phage genome is consist of double stranded DNA. |
| **Q.49** | **B** |  |
| **Q.50** | **A** | There occurs weak chemical union between tail fibers and receptors present on cell wall. |

<table>
<tr><td>Q.51</td><td>B</td><td>Lysozyme destroys bond of peptidoglycan.</td></tr>
<tr><td>Q.52</td><td>A</td><td>Prophage is viral DNA that is integrated with host chromosome during lysogenic cycle.</td></tr>
<tr><td>Q.53</td><td>C</td><td>Prophage is developed in lysogenic stage. In this stage, viral DNA replicates alongwith replication of bacterial chromosome.</td></tr>
<tr><td>Q.54</td><td>C</td><td>Lysozyme is present in the tail portion of bacteriophage.</td></tr>
<tr><td>Q.55</td><td>A</td><td>Landing → Attachment → Tail Contraction → Penetration → Injection → Lytic/ Lysogenic</td></tr>
<tr><td>Q.56</td><td>C</td><td>Structure of Polio<br> 
</td></tr>
<tr><td>Q.57</td><td>A</td><td>This is either due to autoimmunity or vaccination in childhood.</td></tr>
<tr><td>Q.58</td><td>C</td><td>Hepatitis A is always acute while hepatitis B can be acute or chronic.</td></tr>
<tr><td>Q.59</td><td>B</td><td>• Jaundice is a symptom of diseases of liver.<br>• Cirrhosis involves loss of liver cells and irreversible scarring of liver.<br>• Hepatomegaly is enlargement of liver.</td></tr>
<tr><td>Q.60</td><td>A</td><td>All retroviruses are RNA viruses containing copies of single stranded RNA as genome.</td></tr>
<tr><td>Q.61</td><td>D</td><td>Virion is complete, mature, infectious virus.</td></tr>
<tr><td>Q.62</td><td>B</td><td>HIV infects Helper T lymphocytes which have CD4 Receptors.</td></tr>
<tr><td>Q.63</td><td>D</td><td>Envelope remain outside as part of host cell membrane.</td></tr>
<tr><td>Q.64</td><td>D</td><td>Saliva can spread hepatitis but not AIDS.</td></tr>
<tr><td>Q.65</td><td>B</td><td>Vaccination is not effective against AIDS.</td></tr>
<tr><td>Q.66</td><td>B</td><td>Envelope spikes help in attachment with host and made of glycoproteins.</td></tr>
<tr><td>Q.67</td><td>D</td><td>Pleomorphic bacteria lack cell wall, which causes them to have variety of shapes.</td></tr>
<tr><td>Q.68</td><td>B</td><td>The shape of the bacterium is in between a typical coccus and a bacillus, so the shape of second bacterium is ‘coccobacillus’.</td></tr>
<tr><td>Q.69</td><td>B</td><td><table><tr><th>Rod shape</th><th>Spiral shape</th></tr><tr><td>Escherichia coli, Bacillus subtilis,</td><td>Pseudomonas, Hyphomicrobium</td></tr></table></td></tr>
<tr><td>Q.70</td><td>A</td><td>As there is no need of support of organelle in cytoplasm of bacteria so microtubules are not present in bacterial cells.</td></tr>
<tr><td>Q.71</td><td>C</td><td><table><tr><td>Monotrichous</td><td>Single Flagella</td></tr><tr><td>Lophotrichous</td><td>Tuft of flagella at one pole</td></tr><tr><td>Amphitrichous</td><td>Flagella at both pole</td></tr><tr><td>Peritrichous</td><td>Flagella around body</td></tr><tr><td>Atrichous</td><td>No flagella</td></tr></table></td></tr>
<tr><td>Q.72</td><td>B</td><td>Flagella → Thin, Helical, Hair like appendages</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Pili, Fimbrae → Thin, Non-helical, Hollow<br>Cilia → Not present</td></tr>
<tr><td>Q.73</td><td>C</td><td>Basal bodies are structures found at base of flagella which give rise to flagella.</td></tr>
<tr><td>Q.74</td><td>B</td><td>S (Smooth) type Pneumococci are capsulated bacteria. Their capsule is made of polysaccharides.</td></tr>
<tr><td>Q.75</td><td>D</td><td>Essential parts (found in all) of bacteria are chromatin body, ribosomes, cytoplasm and plasma membrane.</td></tr>
<tr><td>Q.76</td><td>C</td><td>Cell – Cell Wall = Protoplast<br>Protoplast – Plasma Membrane = Protoplasm<br>Protoplasm – Nucleus = Cytoplasm</td></tr>
<tr><td>Q.77</td><td>D</td><td>Microtubules are absent in prokaryotic cells.</td></tr>
<tr><td>Q.78</td><td>A</td><td>Due to presence of single molecule of DNA in nucleoid, it is considered as haploid.</td></tr>
<tr><td>Q.79</td><td>C</td><td>Prokaryotic DNA is stained with Feulgen stain.</td></tr>
<tr><td>Q.80</td><td>A</td><td>Prokaryotic DNA is stained with Feulgen stain.</td></tr>
<tr><td>Q.81</td><td>D</td><td>Nucleohistones, Cytoskeleton, Nucleolus are absent in prokaryotic cells.</td></tr>
<tr><td>Q.82</td><td>C</td><td>80S ribosomes are found in eukaryotic cells. Prokaryotic cells have 70S ribosomes.</td></tr>
<tr><td>Q.83</td><td>D</td><td>All these are produced as wastes in different bacteria.</td></tr>
<tr><td>Q.84</td><td>D</td><td>Spores develop resistant to light, temperature, desiccation, pH and chemical agents while cyst provide resistance against desiccation.</td></tr>
<tr><td>Q.85</td><td>C</td><td>
<table>
<tr><th></th><th>Gram positive bacteria</th><th>Gram negative bacteria</th></tr>
<tr><td>Peptidoglycan</td><td>50% of dry weight</td><td>10% of dry weight</td></tr>
<tr><td>Outer membrane</td><td>No</td><td>Yes</td></tr>
<tr><td>Periplasmic space</td><td>Present in some</td><td>Present in all</td></tr>
<tr><td>Permeability</td><td>More permeable</td><td>Less permeable</td></tr>
</table>
</td></tr>
<tr><td>Q.86</td><td>B</td><td>• Microbicidal cause killing of microbes.<br>• Microbistatic inhibit growing capacity.<br>• Broad spectrum has wide use on different types of bacteria.</td></tr>
<tr><td>Q.87</td><td>C</td><td>Sterilization involves killing of all life forms.</td></tr>
<tr><td>Q.88</td><td>C</td><td>The word antibiotic is derived from Greek words meaning against life. As these are used to kill microbes in living organisms.</td></tr>
<tr><td>Q.89</td><td>C</td><td>Antibiotics work only against bacteria.</td></tr>
<tr><td>Q.90</td><td>D</td><td>Antibiotics are synthesized and secreted by Bacteria, Fungi, Actinomycetes.</td></tr>
</table>

# DIVERSITY AMONG ANIMALS

## Introduction, grade radiate, grade bilateria

**Q.1 Group of organisms which have proper left and right sides of body:**
A. Cnidaria
B. Platyhelminthes
C. Sponges
D. Chordates

**Q.2 Which type of mode of nutrition is found in the members of Kingdom Animalia?**
A. Absorptive heterotrophs
B. Ingestive heterotrophs
C. Saprophytic autotrophs
D. Chemoautotrophs

**Q.3 Which of the following is unique to animals?**
A. Cells that have plastids
B. The structural carbohydrate
C. Nervous conduction
D. Heterotrophy

**Q.4 Which of the following is the largest phylum?**
A. Mollusca
B. Arthropods
C. Echinodermata
D. Annelida

**Q.5 The phylum in which first time nerve net arises:**
A. Porifera
B. Platyhelminthes
C. Coelenterate
D. Protozoa

**Q.6 The primitive multicellular animals having cellular level of organization are:**
A. Ctenophores
B. Corals
C. Sponges
D. Crustacean

**Q.7 Study of animals that live and subsist on other animal is:**
A. Pathology
B. Ecology
C. Parasitology
D. Taxonomy

**Q.8 When the body of an animal can be divided into equal left and right halves by one plane symmetry. It is known as:**
A. Bilateral
B. Biradial
C. Radial
D. Asymmetric

**Q.9 Radial symmetry is shown by:**
A. Coelenterate
B. Larva of Echinodermata
C. Platyhelminthes
D. Sponges

**Q.10 Radial symmetry is shown by**
A. Ctenophores
B. Adult echinodermates
C. Coelenterates
D. All A, B, C

## Diploblastic and triploblastic organization, Classification according to coelom (body cavity) & Protostomes, deuterostomes

**Q.11 True difference between mesenchyme of sponges and mesenchyme of acoelomates is:**
A. It is present between ectoderm and endoderm in acoelomates
B. It develops from embryonic body wall in acoelomates
C. It is cellular and living in acoelomates
D. It forms a medium for diffusion of substances in acoelomates

**Q.12 In coelomate the layer that surround endoderm is:**
A. Coelomic epithelium
B. Ectoderm
C. Visceral mesoderm
D. Parietal mesoderm

**Q.13 In proterostomia & deuterostomia respectively, cleavage is:**
A. Indeterminate & spiral
B. Radial & spiral
C. Determinate & indeterminate
D. Determinate and radial

**Q.14 It is not derived from endoderm?**
A. Liver
B. Gastric glands
C. Pancreases
D. Muscles

**Q.15 It is not a germ layer:**
A. Ectoderm
B. Endoderm
C. Mesoderm
D. Blastoderm

**Q.16 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.17 At which developmental stage should one be able to first distinguish a diploblastic embryo from a triploblastic embryo?**

A. Fertilization
B. Cleavage
C. Gastrulation
D. Coelom formation

**Q.18 The undifferentiated layer present between the ectoderm and endoderm in coelenterate is:**

A. Mesophyll
B. Archenteron
C. Gastral layer
D. Mesoglea

**Q.19 Fate of the blastomeres is foretold in:**

A. Echinoderms
B. Hemichordates
C. Arthropods
D. Chordates

**Q.20 In proterostomia & deuterostomia respectively, cleavage is:**

A. Indeterminate & spiral
B. Radial & spiral
C. Determinate & indeterminate
D. Determinate and radial

## Invertebrate Phylums

**Q.21 Sponges mostly feed on:**

A. Phytoplankton
B. Zooplankton
C. Both A and B
D. Detritus

**Q.22 A statement which is false about reproduction in sponges:**

A. They are mostly protandrous but rarely hermaphrodite
B. They have both sexual and asexual reproductions
C. Fertilization occurs in mesenchyme
D. Buds may be external or internal in them

**Q.23 A sponge also known as venus flower basket:**

A. Sycon
B. Spongilla
C. Leucosolenia
D. Euplectella

**Q.24 During its life cycle, Taeniamay enter into body of a healthy human if that person:**

A. Eats improperly preserved chicken
B. Eats improperly cooked beef
C. Eats an infected fish
D. All of these

**Q.25 The system which is complicated and well developed in parasitic platyhelminthes is:**

A. Nervous system
B. Digestive system
C. Muscular system
D. Reproductive system

**Q.26 Which body system is present in each segment of annelids separately?**

A. Digestive system
B. Nerve cord
C. Circulatory system
D. Excretory system

**Q.27 One important factor in success of arthropods to adapt variety of habitats is:**

A. Offense & defense against predators
B. Chitinous exoskeleton
C. Modes of reproduction
D. Metamorphosis

**Q.28 Phylum whose members are mostly endoparasites is:**

A. Platyhelminthes
B. ArthropodaAnnelida
C. Mollusca
D. A. O. T

**Q.29 All of the following insects are beneficial except:**

A. Locust
B. Silk worm
C. Honey bee
D. Butterfly

**Q.30 Which characteristic is shared by both cnidarians and flatworms?**

A. Dorsoventrally flattened bodies
B. Radial symmetry
C. Flame bulbs
D. Digestive system with a single opening

## Vertebrata

**Q.31 Ventral suctorial mouth is characteristic of:**

A. Cartilaginous fishes
B. Bony fishes
C. Hag fishes
D. Amphibians

**Q.32 _____ are first vertebrates on land who developed internal fertilization process:**

A. Dipnoi fishes
B. Amphibians
C. Reptiles
D. Birds

**Q.33 Varanope is a:**

A. Mammal
B. Reptile
C. Mammal like reptile
D. Reptile like mammal

**Q.34 The scales found in chondrichthyes is/are:**

A. Placoid
B. Ctenoid
C. Cycloid
D. All A, B, C

**Q.35 Respiration in tadpole larva is by:**

A. Gills
B. Skin
C. Lungs
D. All of these

**Q.36 Which of the following tract open into a common chamber cloaca in amphibians?**

A. Alimentary
B. Reproductive tract
C. Urinary tract
D. All A, B, C

**Q.37 Which of the following is not true fish?**

A. Exocoetus
B. Saw fish
C. Betta
D. Jelly fish

**Q.38 Retilia means:**

A. Flying mode of locomotion
B. Saltation mode of locomotion
C. Swim mode of locomotion
D. Creeping or crawling mode of locomotion

**Q.39 Kangaroo is a:**

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

**Q.40 Mammals are mostly**

A. Viviparous
B. Ovoviviparous
C. Oviparous
D. All A, B, C

**Q.41 Pseudocoelom is developed from:**

A. Blastostyle
B. Blastocoel
C. Blastocyst
D. Mesoderm

**Q.42 Medusae in coelenterates:**

A. Developed from sexual reproduction
B. Have ability to do asexual reproduction
C. Have gonads
D. Contain gonozoids

**Q.43 Pick a true statement about hydra:**

A. It exhibits alternation of generation
B. It is carnivorous animal
C. Has nematocysts originated from endoderm
D. It has sexual mode of reproduction

**Q.44 _____ are the first group of invertebrates which have developed a nervous system.**

A. Nematoda
B. Annelida
C. Coelenterata
D. Platyhelminthes

**Q.45 One which lives in bile duct of human as an endoparasite:**

A. Dugesia
B. Fasciola
C. Taenia
D. Schistosoma

**Q.46 A cosmopolitan worm is:**

A. Ancylostomaduodenale
B. Enterobiusvermicularis
C. Ascarislumbericoides
D. Rhabditis

**Q.47 "Intense itching of anus, inflammation of mucous membrane of colon and appendix resulting in insomnia and loss of appetite" is caused by:**

A. *Ascaris lumbericoides*
B. *Enterobiusvermicularis*
C. *Hirudomedicinalis*
D. *Fasciola hepatica*

**Q.48 Trochophore larva is not developed in:**

A. Earthworm
B. Leech
C. Neries
D. Chaetopterus

**Q.49 Phylum having largest biodiversity on earth is:**

A. Annelida
B. Mollusca
C. Chordata
D. Arthropoda

**Q.50 Because of its origin from _____, echinoderm skeleton may be considered as endoskeleton:**

A. Mesoderm
B. Ectoderm
C. Endoderm
D. Epidermis

**Q.51 All of the following are affinities of echinoderms with chordates except:**

A. Both have high regenerative abilities
B. Both have similar early development
C. Both are deuterostomes
D. Both have endoskeleton

**Q.52 Which of the following characteristics in birds is not helpful for flight phenomenon?**

A. Absence of bladder
B. Development of keel
C. Light weight skeleton
D. Development of syrinx

**Q.53 Animals of kingdom Animalia possess all characters except:**

A. Diploid
B. Embryonic development
C. Unicellular
D. Eukaryotic

**Q.54 The cylindrical body of a sea anemone can be cut in two equal halves. It represents:**

A. Diploblastic organization
B. Radial symmetry
C. Triploblastic organization
D. Bilateral symmetry

**Q.55 Radial symmetry is present in:**

A. Sycon
B. Cockroach
C. Hydra
D. Human

**Q.56 You are trying to identify an organism. It is an animal, but it does not have nerve or muscle tissue. It is neither diploblastic nor triploblastic. It is probably a:**

A. Flatworm
B. Nematode
C. Cniderian
D. Sponge

**Q.57 Animals which do not have a body cavity:**

A. Acoelomata
B. Pseudocoelomata
C. Coelomata
D. Deuterostomes

**Q.58 In deuterostomes mesoderm is derived from wall of developing?**

A. Coelom
B. Schizocoelous
C. Archenteron
D. Margin of blastopore

**Q.59 Common housefly is involved in spread of all except:**

A. Hepatitis
B. Dysentery
C. Malaria
D. Cholera

**Q.60 First invertebrate to develop a nervous system is:**

A. Sponge
B. Cnidarian
C. Flat worm
D. Round worm

**Q.61 It is not a feature of animals belong to sub-kingdom parazoa:**

A. Lack tissue organization
B. Simplest of all the animals
C. Determinate shape
D. Asymmetrical

**Q.62 _____ have radial symmetry in their adult form.**

A. Annelids
B. Molluscs
C. Echinoderms
D. Hemichordates

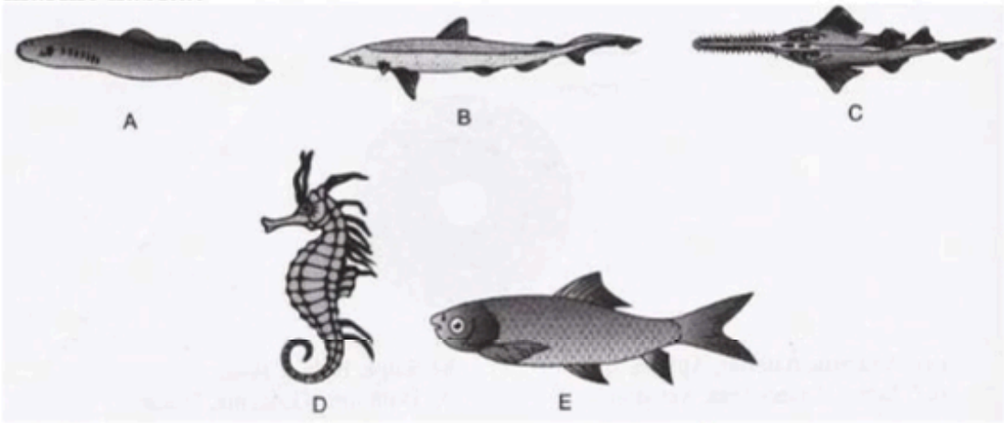
**Q.63 Open circulatory system and chitinous exoskeleton are the features related to phylum _____.**

A. Cnidaria
B. Mollusca
C. Annelida
D. Arthropoda

**Q.64 It is commonly known as pin worms:**

A. Ascaris lumbricoides
B. Fasciola hepatica
C. Ancylostoma duodenale
D. Enterobius vermicularis

**Q.65 Find out the total number of organisms given in following figure that belongs to marine habitat**




A. 1
B. 4
C. 3
D. 5

**Q.66 The last common ancestor of all animals was probably a:**

A. Unicellular chytrid
B. Unicellular yeast
C. Plant
D. Flagellated protist

**Q.67 The below figure shows which type of symmetry:**

A. Bilateral
B. Biradial
C. Radial
D. Asymmetry

**Q.68 Bilaterally symmetrical animals are:**

A. Lesser developed
B. Lacking mesoderm
C. Placed in one phylum only
D. Triploblastic

**Q.69 An animal found from ocean was observed to have no tissue organization is most likely to be the member of phylum:**

A. Porifera
B. Coelenterate
C. Echinodermata
D. Hemichordate

**Q.70 The animals in grade bilateria and triploblastic are all except:**

A. Platyhelminthes, nematode
B. Annelida, mollusca
C. Arthropoda, and chordate
D. Cnidaria

**Q.71 The first diploblastic animals showing tissue level of organization is**

A. Sycon
B. Taenia
C. Gorgonia
D. Locust

**Q.72 Triploblastic animal contains**

A. Ectoderm
B. Endoderm
C. Mesoderm
D. All A, B, C

**Q.73 In coelomate the layer that surround endoderm is:**

A. Coelomic Epithelium
B. Ectoderm
C. Visceral Mesoderm
D. Parietal Mesoderm

**Q.74 Metameric segmentation is found in**

A. Annelida
B. Both A and B
C. Arthropoda
D. Platyhelminthes

**Q.75 Notochord is derived from which layer?**

A. Ectoderm
B. Endoderm
C. Mesoderm
D. All A, B, C

**Q.76 A fluid filled cavity which is mesodermal in origin but absent in nematodes is:**

A. Coelom
B. Gastrocoel
C. Pseudocoelom
D. Spongocoel

**Q.77 The following features belong to which of the following phylum?**

**(1). Triploblastic**
**(2). Bilateral symmetry**
**(3). Eucoelomates Metamerism**

A. Mollusca
B. Platyhelinthes
C. Aschelminthes
D. Annelida

**Q.78 In some animals, the body cavity is not lined by mesoderm. Instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called**

A. Eucoelom
B. Acoelom
C. Pseudocoelom
D. Any of the above

**Q.79 Aschelminthes are**

A. Eucoelomates
B. Acoelomate
C. Pseudocoelomates
D. None of these

**Q.80 Spiral and determinate type cleavage is present in:**

A. Pinworm
B. Star fish
C. Cake urchin
D. Amphioxus

**Q.81 In which of the following development of coelom is via outpouching of archenteron:**

A. Schizocoelus
B. Enterocoelous
C. Both A and B
D. None of these

**Q.82 Largest vertebrate animal is:**

A. Whale
B. Shark
C. Sting ray
D. Elephant

**Q.83 Which fish possess electric organs?**

A. Scoliodon (dog fish)
B. Electric ray
C. Trygon
D. Pristis (saw fish)

**Q.84 Air bladder which regulates buoyancy is present in:**

A. Cyclostomata
B. Bondy fishes
C. Cartilaginous fish
D. Amphibians

**Q.85 The name 'amphibian' indicates that they can live in:**

A. Aquatic habitat
B. Terrestrial habitat
C. Both A and B
D. Aerial habitat

**Q.86 Varanope is a:**

A. Mammal
B. Reptile
C. Mammal like reptile
D. Reptile like mammal

**Q.87 Archaeopteryx is connecting link between:**

A. Fishes & amphibians
B. Amphibians & reptiles
C. Reptiles & birds
D. Reptiles & mammals

**Q.88 Which of the following mammal have aerial adaptation?**

A. Felis
B. Bat
C. Canis
D. Macropus

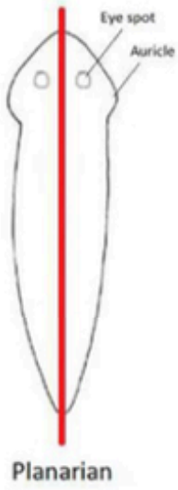
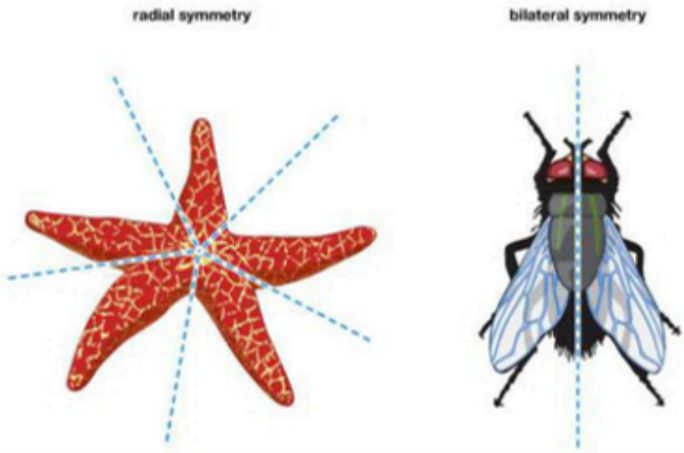
**Q.89 Animal belonging to phylum chordate shows**

A. Bilateral symmetry, triploblastic and the coelom
B. Organ system level of organization
C. Closed circulatory system
D. All of these

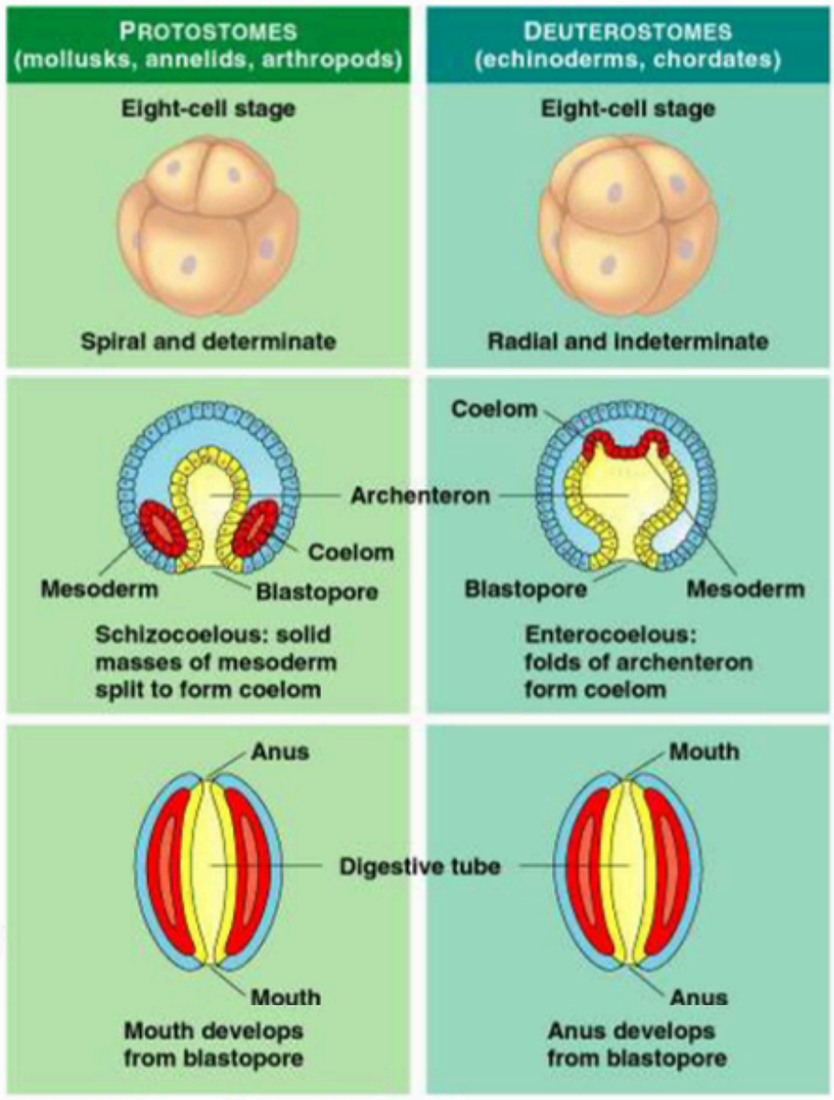
**Q.90 Which of the following is cold blooded?**

A. Frog
B. Owl
C. Penguin
D. All A, B,

## ANSWERS & EXPLANTION: -

| | | |
|---|---|---|
| **Q.1** | **B** |  |
| **Q.2** | **B** | All animals belong to kingdom Animalia are heterotrophs and have ingestive mode of nutrition. They are dependent to producers. |
| **Q.3** | **C** | Nervous system is only present in animals for coordination and proper response to stimulus. |
| **Q.4** | **B** | Most abundant organisms present on the earth belong to phylum arthropods. They are 53.1% of total life on earth. |
| **Q.5** | **C** | Phylum coelentera also called cnidaria develop diffused nervous system first time. Members of this phylum give whole body response. |
| **Q.6** | **C** | Sponges lack tissues organized into organs and have indeterminate shape, and are asymmetrical and multicellular. |
| **Q.7** | **C** | Parasitology is the branch of biology that deals with the study of parasite that get shelter and food from other animals. |
| **Q.8** | **A** |  |
| **Q.9** | **A** | Animals from phylum coelenterates and adult animal from phylum Echinodermata have radial symmetry. |
| **Q.10** | **D** | Animals from phylum coelenterates, adult animal from phylum Echinodermata and ctenophores (comb jellies) have radial symmetry. |
| **Q.11** | **C** | Mesenchyme of sponges is a non-cellular gelatinous mass while mesenchyme of acoelomates is cellular structure |
| **Q.12** | **C** | Coelom (body cavity) is formed due to splitting of mesoderm at embryonic stage. Its outer layer is called parietal layer which underline the body wall, while inner layer is called visceral layer that surround the endoderm. |

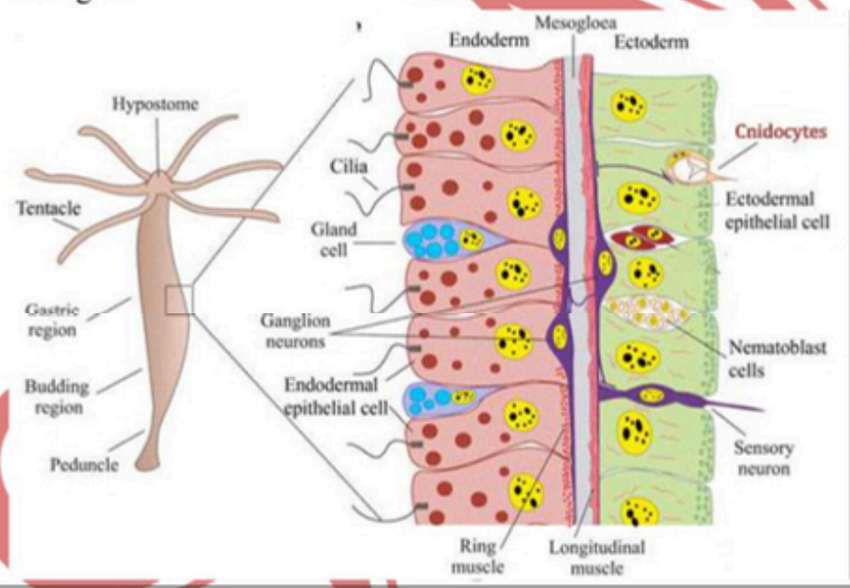
**Q.13** **C**

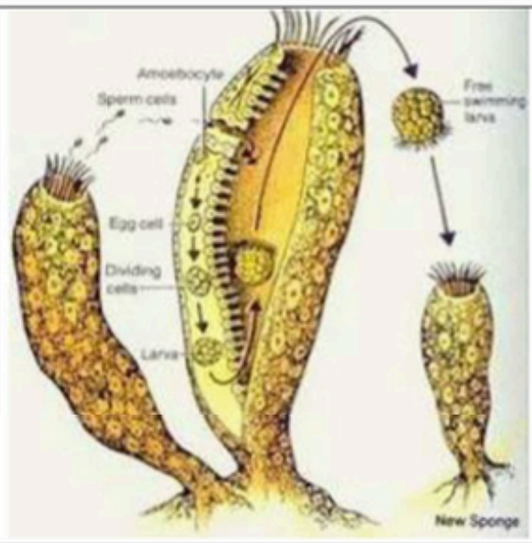
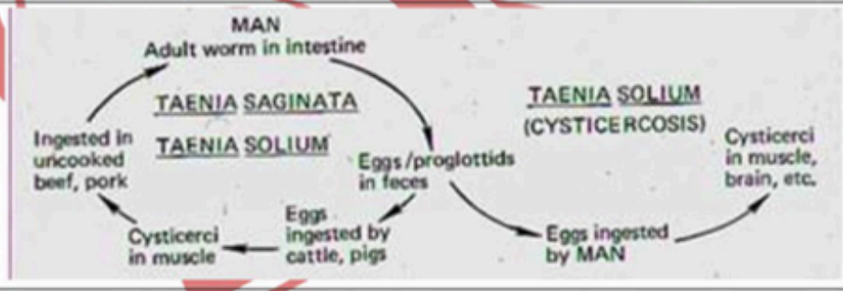



**Q.14** **D**

| Ectoderm | Mesoderm | Endoderm |
|---|---|---|
| Epidermis | Bones, cartilage, tendon | Digestive System |
| Central Nervous System | Muscle (smooth, striated) | Respiratory System |
| Neural Crest Derivatives:<br>• Peripheral Nervous System<br>• Melanocytes<br>• Facial cartilage<br>• Dentin of teeth<br>• Skull bones | Circulatory System, including heart, vessels | Pancreas |
| | Lymphatic system | Liver |
| | Gonads | Thyroid Epithelium |
| | Kidney | Parathyroid Epithelium |
| | Adipose Tissue | Thymus |
| | Notochord | Bladder |

**Q.15** **D** **SEE EXPLANATION OF Q.14**

<table>
<tr><td>Q.16</td><td>B</td><td>
<table>
<tr><th>Embryonic Germ Layer</th><th>Vertebrate Adult Structures</th></tr>
<tr><td>Ectoderm (outer layer)</td><td>Epidermis of skin; epithelial lining of mouth and rectum; nervous system</td></tr>
<tr><td>Mesoderm (middle layer)</td><td>Skeleton; muscular system; dermis of skin; circulatory system; excretory system; reproductive system, including most epithelial linings; outer layers of respiratory and digestive systems</td></tr>
<tr><td>Endoderm (inner layer)</td><td>Epithelial lining of digestive tract and respiratory tract; associated glands of these systems; epithelial lining of the urinary bladder</td></tr>
</table>
</td></tr>
<tr><td>Q.17</td><td>C</td><td>As gastrula stage has germinal layers during embryo development. So organism would be identified either it is triploblastic or diploblastic.</td></tr>
<tr><td>Q.18</td><td>D</td><td>Coelenterate like hydra are diploblastic. They have a fluid both layers which is called mesoglea.<br> 
</td></tr>
<tr><td>Q.19</td><td>C</td><td>Arthropods are proterostomes in which cleavage is determinate (fate of blastomeres is foretold). Each blastomere developed into its special structure.</td></tr>
<tr><td>Q.20</td><td>C</td><td>SEE EXPLANATION OF Q.13</td></tr>
<tr><td>Q.21</td><td>D</td><td>20% food of sponges depends upon zooplankton and phytoplankton. 80% is dependent on detritus organic material.</td></tr>
</table>

| | | |
|---|---|---|
| | |  |
| **Q.22** | **A** | Some sponge species reproduce sexually. These are mostly hermaphrodite, mostly protandrous, i.e. male sex cells develop first. In some sponges the sexes are separated. |
| **Q.23** | **D** |  |
| **Q.24** | **B** |  |
| **Q.25** | **D** | They have centralized nervous system. Poorly developed digestive system. They are hermaphrodite both male and female reproductive organs are present in the same individual. Larval form is sometimes present. |
| **Q.26** | **D** | They have metanephridium for excretion. |

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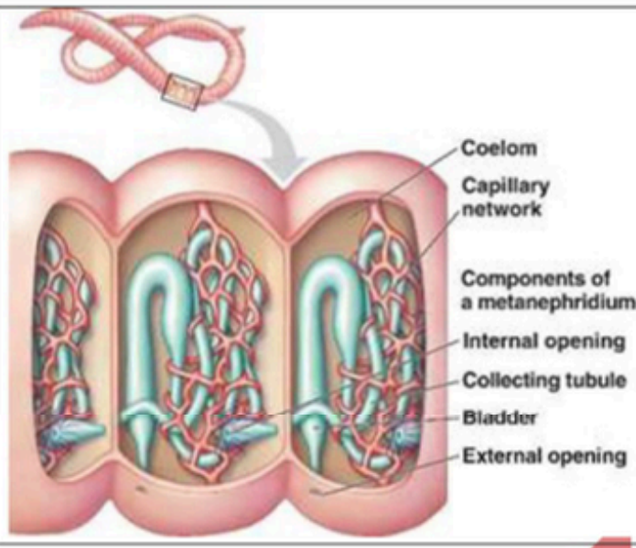
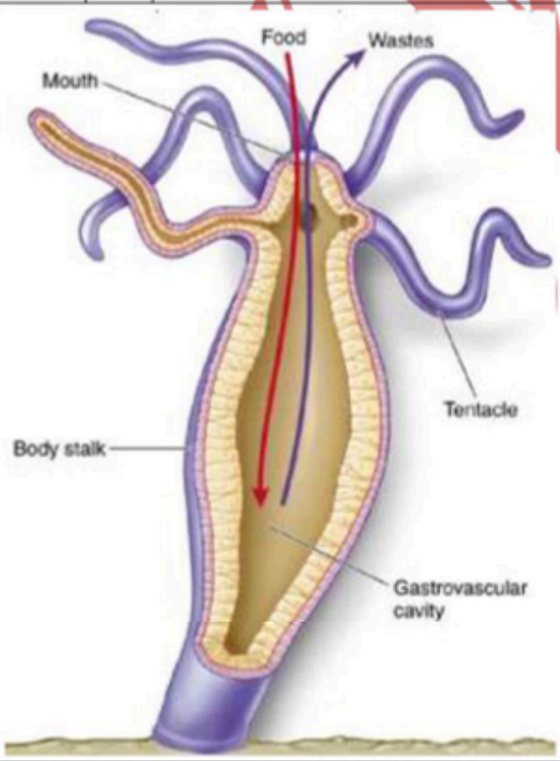
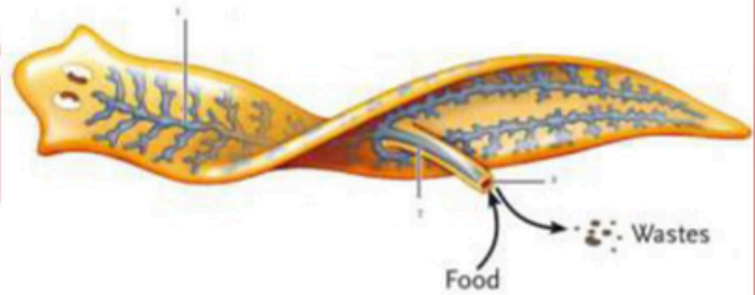
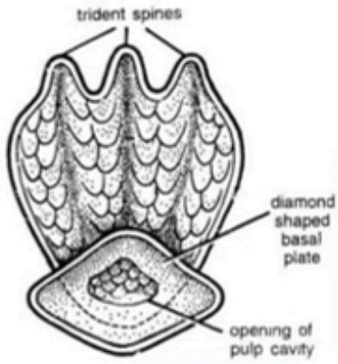
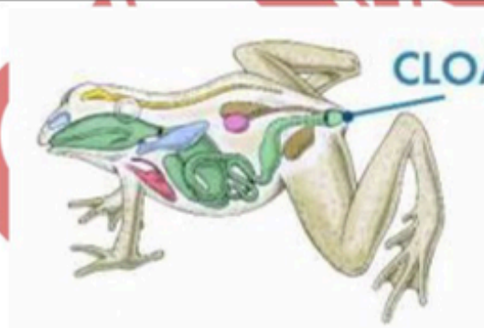
| | |  |
| **Q.27** | **B** | Their exoskeleton enable them to face rough environmental conditions, protects from anomies and also against to the dehydration. |
| **Q.28** | **A** | With few exceptions the Platyhelminthes are parasites, mostly endoparasites. They live inside their hosts. The most common examples are Taenia solium (tapeworm), Fasciola hepatica (liver luke) and Schistosoma (blood luke). |
| **Q.29** | **A** | Locust swarms devastate crops and cause major agricultural damage which results in famine and starvation. Honey bee gives honey. Silk worms give silk and butterfly is beneficial for pollination. |
| **Q.30** | **D** | Both have sac like digestive system. |



| | | |
|---|---|---|
| **Q.31** | **C** |  |
| **Q.32** | **C** | Fishes are first vertebrate organisms on land but they have external fertilization. Reptiles are first vertebrates having internal fertilization. |
| **Q.33** | **C** | Varanope was reptile that was found as fossil in Texas. Probably at least five groups of such mammal-like reptiles developed mammalian characters and were 50% mammals. Mammals became dominant in the Cenozoic period. |
| **Q.34** | **A** | These scales are present at their body   |
| **Q.35** | **A** | During larval stage of development in frog embryo does respiration through gills. |
| **Q.36** | **D** |   |
| **Q.37** | **D** | As jelly fish does not has fins, gill and vertebral column. So it does not fit in the definition of fish. So it is not a fish |

| | | |
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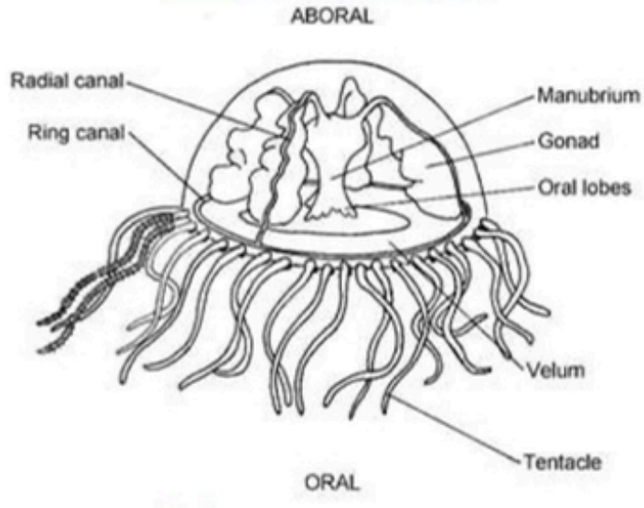
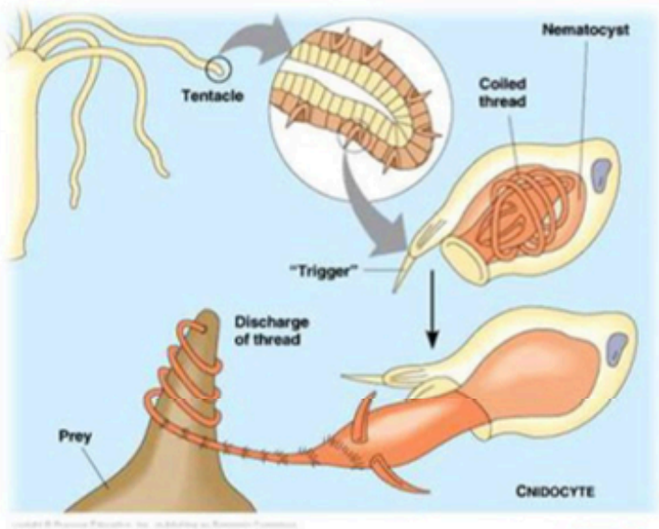
| **Q.38** | **D** | Reptiles move by using their limbs and tails. They cannot up lift their body. |
| **Q.39** | **D** | Metatheria are the most primitive mammals. They are characterized by an abdominal pouch the marsupium where they rear their young. The young when born are immature and are carried by the mother in the marsupium till they develop to their maximum. During this period they are fed on the milk produced by the milk glands of mother, the nipples of which are in the marsupium |
| **Q.40** | **A** | Mammals are mostly viviparous which means they birth their offspring after its complete development. They have internal fertilization also. |
| **Q.41** | **B** | Pseudocoelomdevelops from the blastocoel of the embryo and it is bounded externally by the muscles and internally by the cuticle of the intestine |
| **Q.42** | **C** |  |

| | | |
|---|---|---|
| **Q.43** | **B** |  |
| **Q.44** | **C** | Coelenterates have diffused nervous system while other organisms have central nervous system. |
| **Q.45** | **B** | It is an endoparasite in sheep and occasionally in human beings. It has suckers used for attachment to host tissue. It completes its life cycle in two hosts a snail, sheep or man. It lives in the bile duct of its hosts. |
| **Q.46** | **B** | It is commonly known as pin worm is cosmopolitan but more common in Europe and America. They are parasites in the human caecum, colon and appendix. Their movement causes intense itching of anus, inlammation of mucous membrane of colon and appendix resulting in insomnia and loss of appetite |
| **Q.47** | **B** | *Enterobiusvermicularis* commonly known as pin worm. Pinworms are parasites in the human caecum, colon and appendix. Their movement causes intense itching of anus, inflammation of mucous membrane of colon and appendix resulting in insomnia and loss of appetite |
| **Q.48** | **A** | Annelids have common mode of reproduction is sexual. In some annelids like Nereis the sexes are separate, the fertilization is external and a free swimming trochophore larva is produced during the life cycle |
| **Q.49** | **D** | Arthropoda is the largest group in animal kingdom and has great variety. Insects are found everywhere, many show social behavior. |
| **Q.50** | **A** | The mesodermal cells develop a firm calcareous endoskeleton which may bear spines. Because of its origin, from mesoderm it is called endoskeleton. |
| **Q.51** | **A** | Echinoderms have high regenerative ability while chordates have limited regenerative ability. Both phylums have mesoderm which is derived from the cells close to the blastopore. Both possess mesodermal endo-skeleton. |
| **Q.52** | **D** | Voice producing organ in birds is called syrinx, it is situated at the lower end of trachea near the origin of the two bronchi. |
| **Q.53** | **C** | All animals belong to kingdom Animalia are multicellular, diploid, have embryonic development and eukaryotic but they are not unicellular. |

| | | |
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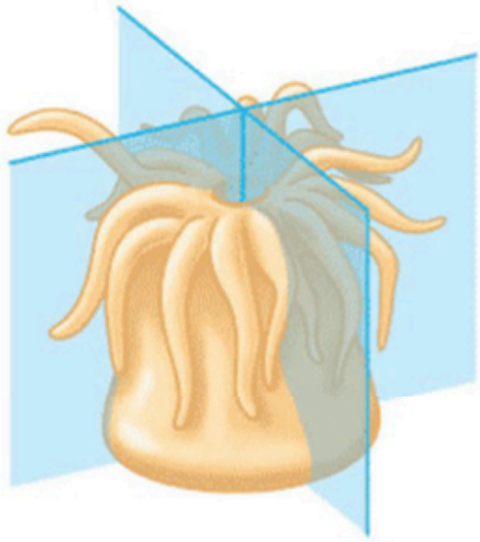
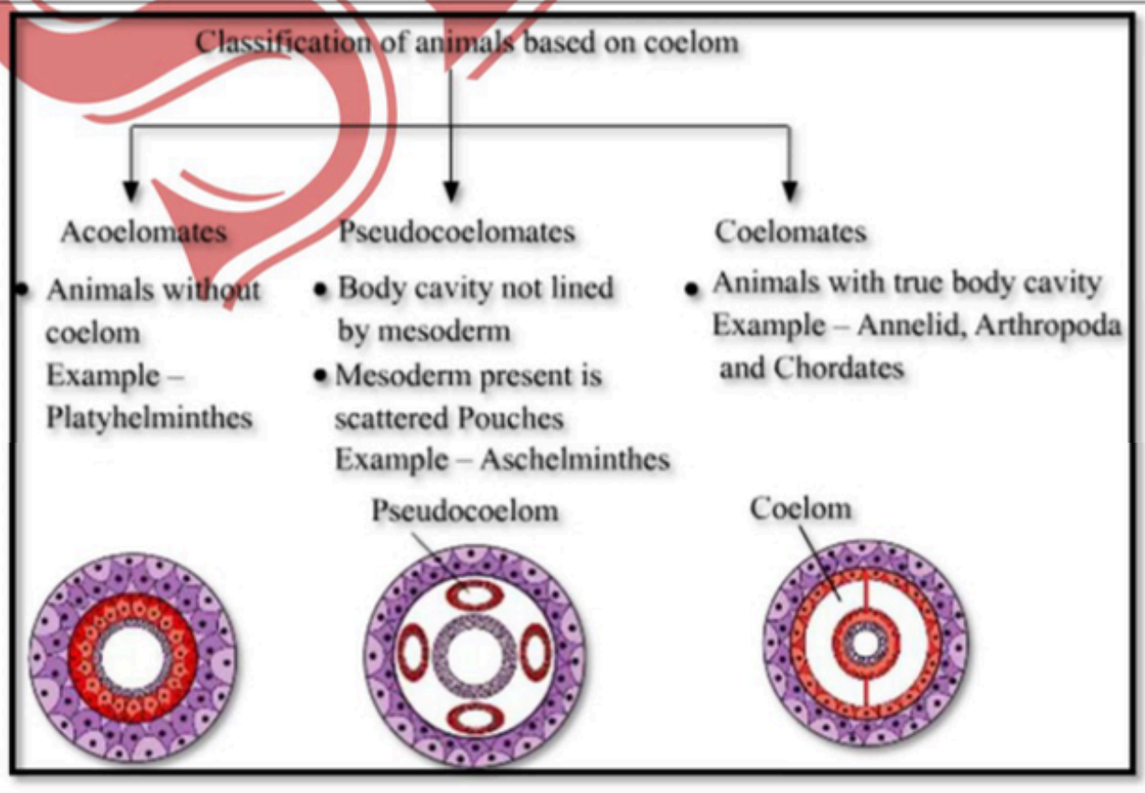
| Q.54 | B |  |
| Q.55 | C |  |
| Q.56 | D | These animals are composed of many cells however there is no tissue organization and have no organs. Sponges lack symmetry. In most sponges the body wall is formed of an outer layer, pinacoderm, made up of cells called pinacocytes: and an inner layer choanoderm made of lagellated collar cells called choanocytes. |
| Q.57 | A |  |

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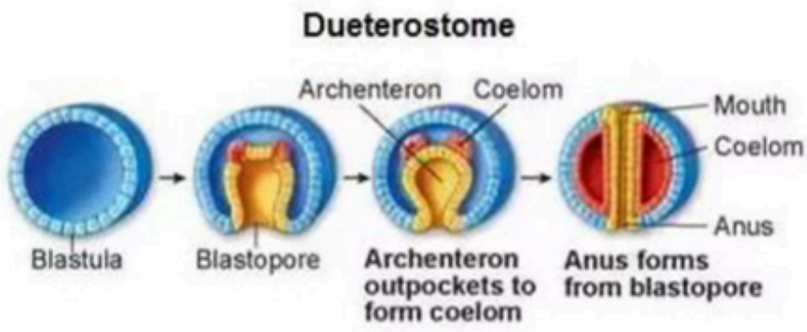
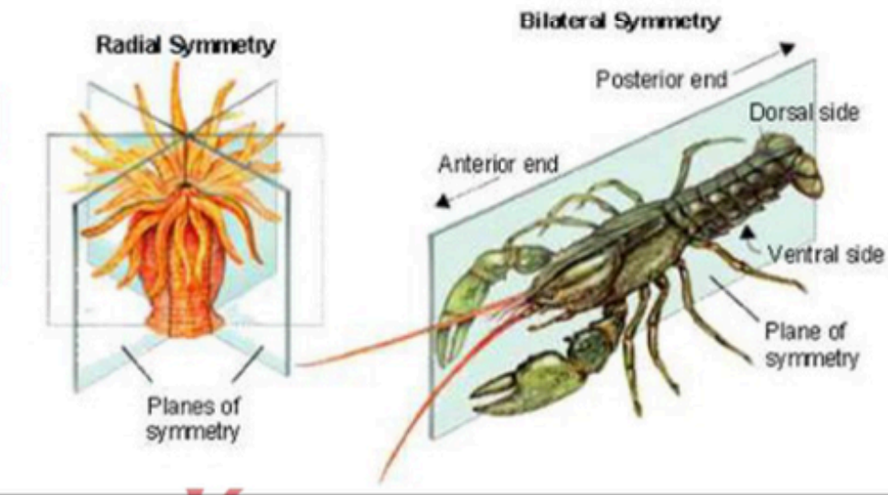
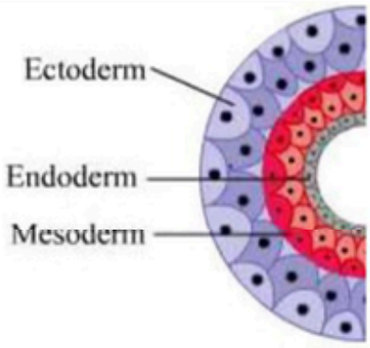
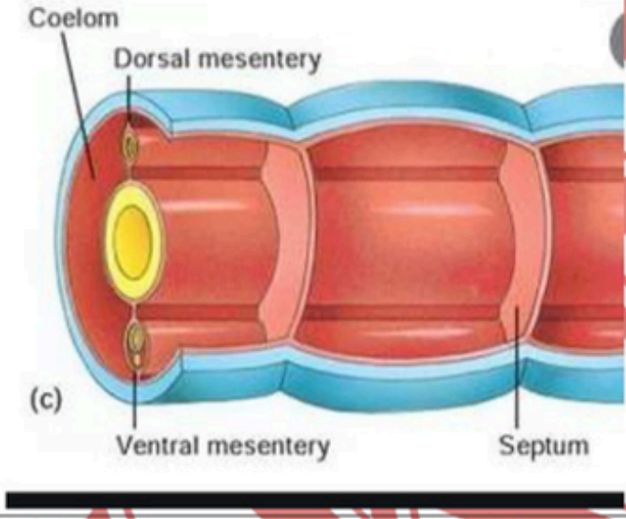
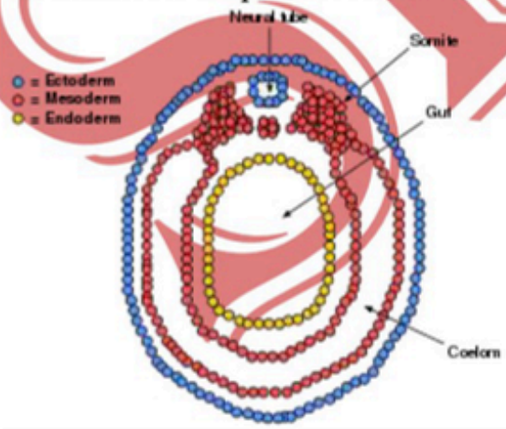
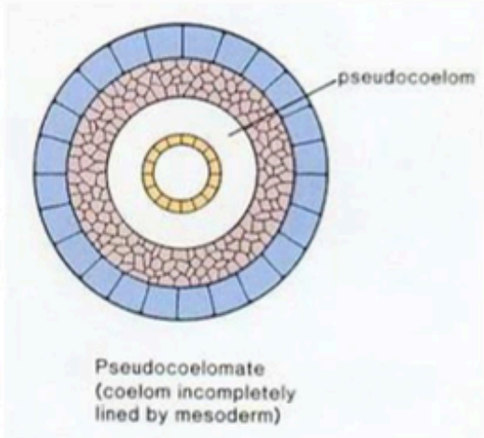
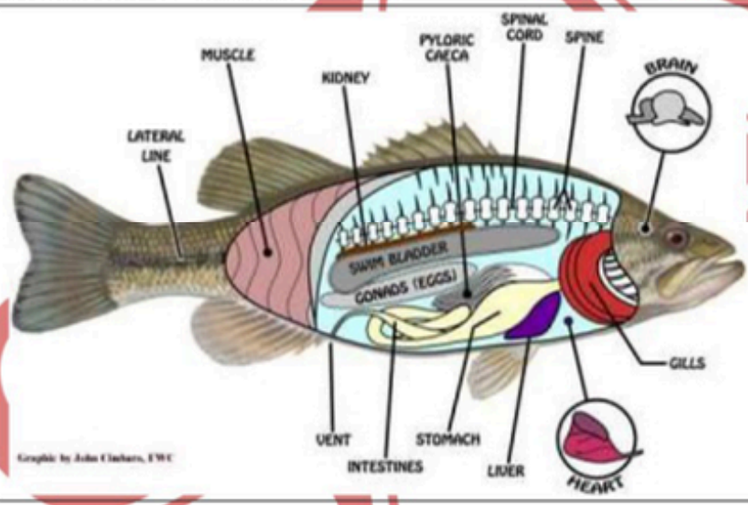
| **Q.58** | **C** |  |
| **Q.59** | **C** | Malarial parasitc is transmittcd by biting of fcmalc anophclcs mosquito. |
| **Q.60** | **B** | They have diffused nervous system that appeared in kingdom Animalia first time. |
| **Q.61** | **C** | Porifera belongs to parazoa which are asymmetrical animals. They don't have definite shape. |
| **Q.62** | **C** | In echinoderms, larval forms exhibit bilateral symmetry but the adults show radial symmetry which is an adaptation for their special mode of life. |
| **Q.63** | **D** | Arthropods have open circulatory system and chitinous exoskeleton that protects them from enemies, rough environment and dehydration. Any other phylum of invertebrate does not has these characters. |
| **Q.64** | **D** | Pinworms are parasites in the human caecum, colon and appendix. Their movement causes intense itching of anus, inflammation of mucous membrane of colon and appendix resulting in insomnia and loss of appetite. |
| **Q.65** | **B** | A, B, C and E are fishes because they have fins and gills. So they have marine habitat. |
| **Q.66** | **D** | It is believed that animal kingdom is evolved from protists having flagella. |
| **Q.67** | **C** |  |
| **Q.68** | **D** | Because they have they have three germinal layers during their gastrulation stage. |
| **Q.69** | **A** | Unlike Protozoans, the Poriferans 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. |
| **Q.70** | **D** | **General characteristics of Phylum coelenterata**<br>**Kingdom**: Animalia.<br>**Habitat**: aquatic, mostly marine.<br>**Habit**: solitary or colonial<br>**Symmetry**: radially symmetrical<br>**Grade of organization**: tissue grade of organization. Germ layer: diploblastic, outer ectoderm and inner endoderm. |

| | | |
|---|---|---|
| **Q.71** | **C** | Sycon is asymmetric because it is a sponge. Taenia is flat worm and triploblastic. Locusts are insect and triploblastic. Gorgonia is diploblastic with radial symmetry. |
| **Q.72** | **D** | Triploblastic animals have three germinal layers during their gastrulation stage. So they have ectoderm, mesoderm and endoderm. |
| **Q.73** | **C** |  |
| **Q.74** | **A** |  |
| **Q.75** | **C** | The notochord develops ventral to ectoderm and this means it originates from mesoderm. First, it lies below the ectoderm then below the neural plate, and finally under the neural tube |
| **Q.76** | **A** | As nematodes are pseudocoelomates.<br>  |
| **Q.77** | **D** | Due to metamerism phylum Annelida is more appropriate among these options. |

| | | |
|---|---|---|
| **Q.78** | **B** |  |
| **Q.79** | **C** | Their body cavity is not lined by mesoderm. Instead the mesoderm is present as scattered pouches in between the ectoderm and endoderm. |
| **Q.80** | **A** | Pinworm belong to phylum nematode which mean it is proterostomes. |
| **Q.81** | **B** | **SEE EXPLANATION OF Q.13** |
| **Q.82** | **A** | With the exception of whale the sharks are the largest living vertebrates, some reaching 30 - 50 feet in length |
| **Q.83** | **B** | Electric ray has certain dorsal muscles modified into powerful electric organ which can give severe shocks & stun their prey |
| **Q.84** | **B** |  |
| **Q.85** | **C** | Amphibians need water for their reproduction because their sperms move towards egg after swimming in water. Their larvae also formed in water. |
| **Q.86** | **C** | The ancestors of mammals lived simultaneously along with reptiles during the Jurassic times and have been called mammal-like reptiles. Some were only of the size of mice and lived on trees. One of these early reptile was varanope that was found as fossil in Texas. Probably at least five groups of such mammal-like reptiles developed mammalian characters and were 50% mammals. Mammals became dominant in the Cenozoic period |
| **Q.87** | **C** | The earliest known bird fossil is that of archaeopteryx, two species of which have been found from rocks of Jurassic period of earth's history. The fossil shows that archaeopteryx, was about the size of a crow with skull similar to that of present day birds. It had bony teeth in the jaw socket unlike modem birds which do not have teeth. Jaws extended into a beak and there was a long tail. Each wing had three claws. With the exception of feathers these birds showed resemblance to the dinosaurs (giant reptiles of the past). |
| **Q.88** | **B** | Bats are flying mammals. Their limbs are completely webbed which are used for flying |
| **Q.89** | **D** | Phylum chordata has five classes which are fishes, reptiles, amphibians, birds and mammals that have all mentioned characters. |
| **Q.90** | **A** | Frog is cooled blooded animal. Because it is an amphibian. |

# VARIATIONS AND GENETICS/INHERITANCE AND EVOLUTION

## Mendelian Inheritance, Law of Segregation

**Q.1 It is basic unit of biological information:**

A. DNA
B. Gene
C. Allele
D. Gamete

**Q.2 Which one of the following does not have a fix locus?**

A. Polygenes
B. Multiple alleles
C. Pleiotropic gene
D. Jumping gene

**Q.3 Transposons are capable of moving from one site in DNA sequence to other mostly:**

A. On same chromosome
B. On homologous chromosomes
C. Randomly
D. On non-homologous chromosomes

**Q.4 Seed shape in pea plant is:**

A. Trait
B. Phenotype
C. Genotype
D. Genome

**Q.5 The organism chosen by G. Mendel to explain the laws of inheritance was:**

A. *Homo sapiens*
B. *Pisum sativum*
C. *Antirrhinum majus*
D. *Drosophila melanogester*

**Q.6 Which of the following are dominant characters according to Mendel?**

A. Green colored pod and rounded seeds
B. Terminal fruit and wrinkled seeds
C. Yellow pod color and short stem height
D. White flower color and terminal flower position

**Q.7 In Mendel's experiment, nature of seed coat, flower colour, position of flower, pod colour, stem height, etc. are referred to as:**

A. Alleles
B. Phenotypes
C. Genotypes
D. Traits

**Q.8 In Mendel's monohybrid cross, what percentage of round seed plants were produced by F1 heterozygous round on self-fertilization?**

A. 25%
B. 50%
C. 75%
D. 100%

**Q.9 In order to explain the mode of inheritance of characters through successive generations, Mendel proposed that the two alternative factors for each character become separated during the formation of gametes and each factors has an equal chance of being transferred to offsprings. This phenomenon is known as:**

A. Law of independent assortment
B. Law of incomplete dominance
C. Law of segregation
D. Law of co-dominance

**Q.10 According to Mendel's monohybrid cross, the characters which appears in F1 is said to be:**

A. Recessive
B. Co-recessive
C. Dominant
D. Partially dominant

## Law of independent assortment, Dominance Relations, Multiple Alleles (ABO blood group System & Rh Blood group system

**Q.11 What will be the probability of a round green seed in a dihybrid cross if the independent probability of a round seed is 3/4 and green seed is 2/4?**

A. $\frac{5}{8}$
B. $\frac{6}{8}$
C. $\frac{3}{16}$
D. $\frac{6}{16}$

**Q.12 The pedigree shows the occurrence of albinism which is a recessive trait. If person 4 is homozygous, the carrier for the trait is:**

A. 1, 4, 5 and 6
B. 1, 2 and 3
C. 5 and 6
D. 1, 2, 5 and 6

**Q.13 How many types of gametes are produced by an organism with genotype of 'AaBB'?**

A. 1 B. 2
C. 3 D. 4

**Q.14 _____ is a physiological effect of an allele over its partner allele on same gene locus.**

A. Epistasis B. Dominance
C. Bombay phenotype D. Gene linkage

**Q.15 The phenotype of heterozygote exceeds in quantity as compared to homozygotes in case of:**

A. Complete dominance B. Incomplete/partial dominance
C. Co–dominance D. Over–dominance

**Q.16 A gene showing co-dominance has:**

A. Alleles tightly liked on the same chromosome
B. Alleles those are recessive to each other
C. Both alleles independently expressed in the heterozygote
D. One allele dominant on the other

**Q.17 If a trait is controlled by two or more than two genes, then such genes are called as:**

A. Multiple alleles B. Pleiotropic genes
C. Polygenes D. Continuously varying traits

**Q.18 A mother of blood group 'O' has child with blood group 'O'. The blood group of father could be:**

A. 'A' or 'B' B. 'O' only
C. 'AB' only D. 'A' or 'B' or 'O'

**Q.19 If a child has O type of blood group and the father has B type, then the genotype of the father will be:**

A. i i B. i $I^B$
C. $I^AI^B$ D. $I^BI^B$

**Q.20 These are not found in blood of a normal person having A positive blood group:**

A. An antigens B. Anti-B antibodies
C. Rh antigens D. Anti-Rh antibodies

## Gene linkages and crossing over, Recombination Frequency and Genetic Map of Chromosome

**Q.21 Mendel's law of independent assortment is applicable for:**

A. All genes in all organisms B. All linked genes only
C. All genes of pea plant only D. All non-linked genes only

**Q.22 Number of linkage group in Pisum sativum is:**

A. 2 B. 7
C. 5 D. 9

**Q.23 Physical association of two genes is known as:**

A. Heterozygosis B. Recombination
C. Linkage D. Homozygosis

**Q.24 Which of the following is a physical relation between genes?**

A. Dominance B. Epistasis
C. Gene linkage D. Pleiotropy

**Q.25 Genes for which of the following form a linkage group on chromosome 11?**

A. Leukemia, Albinism B. Hemophilia, Gout
C. Gout, Sickle cell anemia D. Color blindness, Hemophilia

**Q.26 Crossing over occurs in:**

A. Mitotic cells B. Meiotic cells
C. Amitotic cells D. Mutating cells

**Q.27 Transfer of genes from one chromosome to another and vice versa during synapsis is called:**

A. Chiasmata B. Translocation
C. Transposons D. Crossing over

**Q.28 Crossing over occur during:**

A. Diplotene
B. Leptotene
C. Pachytene
D. Diakinesis

**Q.29 Genes can be mapped on a chromosome on the basis of their:**

A. Tetrad formation
B. Location of jumping genes
C. Chiasmata formation
D. Recombination frequencies

**Q.30 There are 80% parental and 20% recombinant in a cross. Its recombinant frequency is:**

A. 10%
B. 20%
C. 40%
D. 80%

## Sex Linkage in Drosophila, Sex Linkage in Humans (Hemophilia and Color blindness)

**Q.31 XXY set of chromosomes in Drosophila produces**

A. Fertile Female
B. Klinefelter's Syndrome
C. Sterile female
D. Sterile Male

**Q.32 Chromosomal combination of a person with tfm syndrome is:**

A. XO
B. XY
C. XX
D. XYY

**Q.33 Gene for blood clotting factor XI is located on:**

A. X chromosome
B. Y chromosome
C. Autosome
D. Both X & Y chromosomes

**Q.34 Partially functional opsins are present in**

A. Protanopia
B. Deuteranopia
C. Red green colorblindness
D. Protanomalous

**Q.35 Gene for formation of blue opsins is located on:**

A. Chromosomes X
B. Chromosome Y
C. Chromosome # 7
D. Chromosome X and Y

**Q.36 Weak perception of green colour is:**

A. Protanopia
B. Protanomalous
C. Deuteranopia
D. Deuteranomalous

**Q.37 A person having recessive alleles for blue opsins on autosome 7 can perceive:**

A. Blue color
B. Red and green colors
C. All three primary colors
D. Red and blue colors

**Q.38 A normal woman whose father was red-blind marries a red-blind man. What proportion of their children can have normal colour vision?**

A. 25%
B. 75%
C. 50%
D. 100%

**Q.39 Hypophosphatemic rickets is due to a protein defect that does not respond to vitamin D signal. This protein is located on:**

A. Liver cells
B. Bone cells
C. Intestinal cells
D. Skin cells

**Q.40 All of the followings can be a cause of rickets except:**

A. Gene mutation
B. Lower calcium in diet
C. Lack of vitamin D
D. X linked recessive allele

## Evolution

**Q.41 Theory of catastrophism was presented by:**

A. Lyell
B. Malthus
C. Cuvier
D. Darwin

**Q.42 Bacteria involved in evolution of flagella were:**

A. Cocci
B. Spirochete
C. Bacilli
D. Spirogyra

**Q.43 The base of Lamarckism is:**

A. Selection
B. Effect of metabolism
C. Effect of environment
D. Isolation

**Q.44 All of the following are related to evolution except:**

A. Change over time
B. Antibiotic resistance in bacteria
C. Muscle hypertrophy
D. Origin of new species

**Q.45 In Darwin's hypothetical evolutionary tree, tips of living twigs represent:**

A. Ancestral History
B. Current Biodiversity
C. Common skills
D. Fossils

**Q.46 All of the following are points of theory of natural selection except:**

A. Descent with modification
B. Survival of the fittest
C. Struggle for existence
D. Inheritance of acquired characters

**Q.47 Darwin suggested that populations of individual species become better adapted to their local environment through:**

A. Random distribution
B. Asexual reproduction
C. Natural selection
D. Hibernation

**Q.48 Darwin's experiment on finches is based upon:**

A. Biogeography
B. Fossil record
C. Comparative embryology
D. Molecular biology

**Q.49 Which is not an example of homologous structure?**

A. Human arm & forelimb of goat
B. Tail bone of human & monkey
C. Leg of a dog and flipper of whale
D. Fins of fish & flipper of whale

**Q.50 The presence of gill slits in the embryos of vertebrates support the theory of:**

A. Metamorphosis
B. Organic evolution
C. Recapitulation
D. Biogenesis

**Q.51 All of the following are true about alleles except:**

A. They are always identical
B. They control same trait
C. Present on respective homologue
D. Can be expressed independently

**Q.52 Genetic make-up of a trait is called:**

A. Phenotype
B. Genotype
C. Genome
D. Gene pool

**Q.53 A pair of gene controlling a trait is called:**

A. Factor
B. Alleles
C. Paramorphos
D. Allolocus

**Q.54 Two allelic genes are located on:**

A. The same chromosomes
B. Two non-homologous chromosomes
C. Two homologous chromosomes
D. Any two chromosomes

**Q.55 _____ is the basic unit of biological information:**

A. Gamete
B. Chromosome
C. DNA
D. Gene

**Q.56 The haploid chromosome number in pea is:**

A. 8
B. 7
C. 10
D. 14

**Q.57 Which of the following is considered as a recessive character of Mendel?**

A. Green pod color
B. Round seed shape
C. Axial flower position
D. Wrinkled seed shape

**Q.58 Mendel named the particulate heredity factors, that controlled a particular phenotype as:**

A. Genes
B. Alleles
C. Elementen
D. Traits

**Q.59 Mendel's law of segregation was based on the separation of alleles in the garden pea during:**

A. Pollination
B. Seed formation
C. Gamete formation
D. Embryonic development

**Q.60 In dihybrid cross, out of 16 plants obtained, the number of genotypes will be:**

A. 4
B. 9
C. 16
D. 12

**Q.61 Albinism is a_____ trait.**

A. Autosomal dominant
B. Autosomal recessive
C. Sex-linked dominant
D. Sex-linked recessive

**Q.62 Dominance is physiological effect of an allele over its partner allele occupying:**

A. Same locus on same chromosome
B. Same locus on respective homologue
C. Different locus on same chromosome
D. Different locus on respective homologue

**Q.63 The trait which appeared in F1 mono hybrid pea plants was named by Mendel as?**

A. Dominant
B. Recessive
C. Co-dominant
D. Incompletely dominant

**Q.64 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.65 It acts as universal recipient:**

A. AB +ive
B. AB –ive
C. O -ive
D. O +ive

**Q.66 How many alleles of ABO blood group are present in an individual?**

A. 1
B. 3
C. 2
D. 300

**Q.67 Inheritance of ABO blood group system is an example of:**

A. Multiple allelism
B. Epistasis
C. Partial dominance
D. Dominance

**Q.68 Which of the followings gene is not involved in Rh blood group system?**

A. C
B. E
C. D
D. H

**Q.69 The recombination frequencies between two linked genes can be calculated by backcrossing _____ to _____.**

A. Heterozygote, Heterozygote
B. Heterozygote, homozygous single recessive
C. Homozygous double recessive, Heterozygote
D. Homozygous single recessive, homozygous double recessive

**Q.70 The traits whose genes are located on X-chromosomes are:**

A. Sex linked traits
B. Sex limited traits
C. Sex controlled traits
D. Sex influenced traits

**Q.71 It is an example of X-linked dominant trait and occur more in females as compared to the males:**

A. Hemophilia
B. Color blindness
C. Vit. D resistant rickets
D. Lesch-Nyhan syndrome

**Q.72 Hemophilia B is due to absence or abnormality of blood clotting factor:**

A. VIII
B. IX
C. X
D. XI

**Q.73 Women with normal colour vision whose father was red-green colour blind married a red-green colour blind man. What is the probability of her first-born child being red-green colour blind?**

A. 1.0
B. 0.75
C. 0.66
D. 0.50

**Q.74 Which of the following is X-linked dominant trait in humans?**

A. Hemophilia A
B. Vitamin D resistant rickets
C. Red-green colour blindness
D. Testicular feminization syndrome

**Q.75 Hypophosphatemic rickets is due to:**

A. Deficiency of vitamin D in food
B. Deficiency of calcium in food
C. Deficiency of phosphate in food
D. Absence of protein receptor

**Q.76 Which one is mismatched?**

A. Haemophilia C – autosomal
B. Blue opsin - autosome 7
C. tfm – X chromosome
D. Pattern baldness – X linked

**Q.77 Which of the following is true for pattern baldness?**

A. Heterozygous male is not bald
B. Heterozygous female is bald
C. It is dominant in male
D. It is dominant in female

**Q.78 Among the scientists who believed in divine creation was:**

A. Charles Darwin
B. Carolus Linnaeus
C. Alfred Wallace
D. J.B. de Lamarck

**Q.79 Who developed a theory of natural selection essentially identical to Darwin's?**

A. Hardy-Weinberg
B. Malthus
C. Alfred Wallace
D. Lyell

**Q.80 Archaeobacteria can tolerate maximum temperature up to:**

A. $110^0$C
B. $130^0$C
C. $120^0$C
D. $140^0$C

**Q.81 Earliest life forms appeared in:**

A. Hot methane solution
B. Hot atmosphere
C. Oceans
D. Glaciers

**Q.82 Which is not related to the idea of use & disuse?**

A. Extensively used body parts become longer and stronger
B. Disused body parts deteriorate
C. Bigger biceps of black smith
D. Several types of beaks present in finches

**Q.83 According to Lamarck, extension of neck in giraffe was the result of:**

A. Mutation
B. Natural selection
C. Environmental change
D. Genetic drift

**Q.84 Modifications, an organism acquires during its life time, can be passed along to its offspring is called as:**

A. Origin of species
B. Inheritance of acquired characters
C. Law of natural selection
D. Principles of population

**Q.85 Which one is according to Lamarckism?**

A. Variation →adaptations →inheritance
B. Adaptations →variation → inheritance
C. Recombination → variation → adaptations
D. Mutations →variations → adaptations

**Q.86 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.87 Natural selection can operate on:**

A. Variations
B. Non-heritable variations
C. Heritable variations
D. All A, B, C

**Q.88 According to Darwin survival in the struggle for existence is not random but depends on the _____ constitution of the surviving individuals.**

A. Hereditary
B. Internal Environment
C. External Environment
D. Acquired characters

**Q.89 For evolution, the important requirement is:**

A. Heritable variations
B. Non-heritable variations
C. Use & disuse of organs
D. Developmental anatomy

**Q.90 An important turning point for evolutionary theory was birth of:**

A. Cell biology
B. Modern genetics
C. Population ecology
D. Population genetics

**Q.91 Theory of modern synthesis is a comprehensive theory of evolution which has been developed by reconciliation of:**

A. Lamarckism & Darwinism
B. Hardy & Weinberg work
C. Lamarckism & Mendelism
D. Mendelism & Darwinism

**Q.92 Chronologically reptiles evolved after:**

A. Amphibians
B. Birds
C. Fishes
D. Mammals

**Q.93 Which one is evidence of convergent evolution?**

A. Homology
B. Analogy
C. Vestigial organs
D. Fossils

**Q.94 Wings of birds and insects are examples of:**

A. Divergent evolution
B. Line evolution
C. Convergent evolution
D. Web evolution

**Q.95 Which is not an example of homologous structure?**

A. Human arm & forelimb of goat
B. Tail bone of human & monkey
C. Leg of a dog and flipper of whale
D. Fins of fish & flipper of whale

**Q.96 Pelvis and femur are:**

A. Not present in fishes
B. Vestigial structures in fishes
C. Functional in cartilaginous fishes
D. Vestigial organs in amphibians

**Q.97 The structures which are reduced during the course of evolution and have no apparent functions are called:**

A. Regenerated organs
B. Saltatory organs
C. Vestigial organs
D. Useless organs

**Q.98 Wings of birds and insects are examples of _____ organs and show _____ evolution**

A. Homologous, Divergent
B. Homologous, Convergent
C. Analogous, Divergent
D. Analogous, Convergent

**Q.99 Gill pouches in vertebrates are examples of:**

A. Homologous structures
B. Analogous structures
C. Vestigial structures
D. Primordial structures

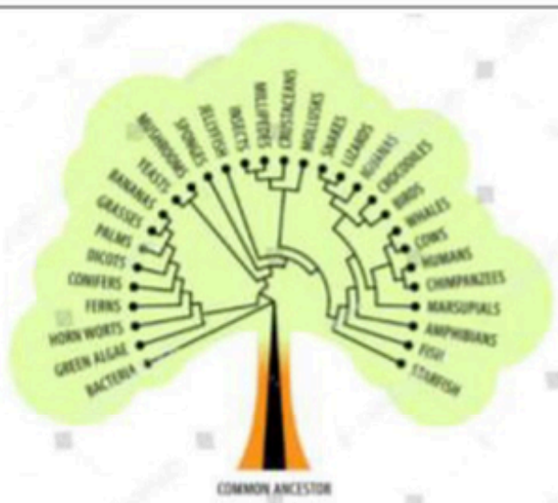
**Q.100 Which of the following's protein is common in all aerobic species?**

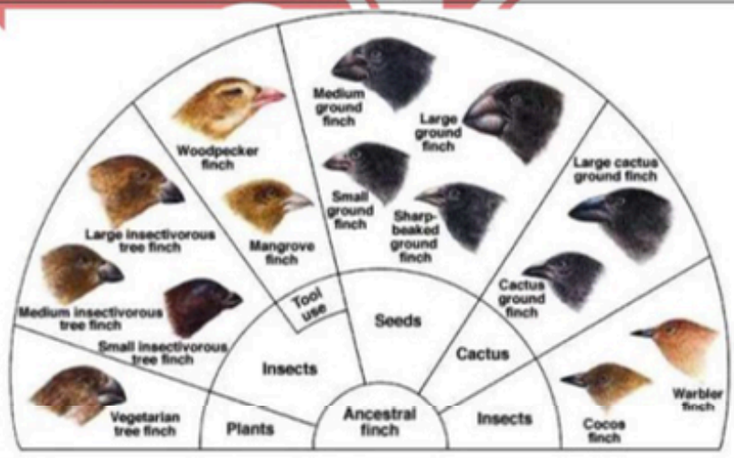
A. Cytochrome b
B. Cytochrome c
C. Cytochrome a
D. Cytochrome a3

## ANSWERS & EXPLANTION: -

| | | |
|---|---|---|
| **Q.1** | **B** | The basic unit of biological information is a sequence of nucleotides that transfers information from parents to offspring. |
| **Q.2** | **D** | Such genes that keep on hooping from one position to another position, also called as transposons do not have fix locus. |
| **Q.3** | **C** | Jumping genes have no fix locus. |
| **Q.4** | **A** | The inheritable characteristics are traits. i.e. flower colour is a trait and red or white is phenotypes. |
| **Q.5** | **B** | G. Mendel chosen P. sativum to perform series of breeding experiments because it was easy to cultivate and grow well in garden. Its flowers are hermaphrodite. It was normally self-pollinating, but could also be cross-fertilized. Mendel could raise many generations within short time because of short generation gap. |
| **Q.6** | **A** | Green colored pods and rounded seed are dominant characters while wrinkled seeds, yellow pod color, short stem height, white flower color and terminal flower position are recessive characters of P. sativum. |
| **Q.7** | **D** | Genotype is the genetic complement i.e., the genes in an individual for a particular trait. A flower may be red or white in colour. Flower colour is a trait and red and white are its two phenotypes. |
| **Q.8** | **C** | $F_2$ self-fertilization of heterozygous round will give the same results as self-fertilization of $F_1$ round. |
| **Q.9** | **C** | Mendel's law of Segregation states that 'allele pairs separate or segregate during gamete formation and randomly unite at fertilization' |
| **Q.10** | **C** | Dominant and recessive traits exist when a trait has two different forms at the gene level. The trait that first appears or is visibly expressed in the organism is called the dominant trait. The trait that is present at the gene level but is masked and does not show itself in the organism is called the recessive trait. |
| **Q.11** | **D** | Probabilities of events in a dihybrid cross are calculated by product rule. |
| **Q.12** | **D** | Half of the offspring of two carriers for albinism must be affected. All offspring of an affected individual and normal individual will be carrier. |
| **Q.13** | **B** | This can be done according to Mendel's law of independent assortment. |
| **Q.14** | **B** | When an effect caused by a gene or gene pair at one locus interferes with or hides the effect caused by another gene or gene pair at another locus, such a phenomenon of gene interaction is called epistasis. i.e. Bombay phenotype |
| **Q.15** | **D** | In fruit fly Drosophila the heterozygote (w+/w) has more quantity of fluorescent pigments in eyes than wild (w+/w+) or white eye (w/w) homozygotes. |
| **Q.16** | **C** | If both alleles independently expressed in a heterozygote, then the phenomenon will be co-dominance. |
| **Q.17** | **C** | Single genes having more than 2 alleles are called as multiple alleles whereas when a single gene control more than one trait is called pleiotropy. |
| **Q.18** | **D** | Blood group 'O' is the result of two recessive alleles 'ii'; one comes from each parent. |
| **Q.19** | **B** | If a child has O type of blood group, the genotype of his/her father will never be $I^AI^B$ and $I^BI^B$. |
| **Q.20** | **D** | A person having A positive blood group have antigen A and Rh-antigen on the surface of RBC's, and anti-B antibodies in blood plasma. |
| **Q.21** | **D** | Linked genes cannot assort independently. |
| **Q.22** | **B** | Pea has seven linkage groups corresponding to its haploid number of chromosomes. |
| **Q.23** | **C** | Genes are linked linearly on the same DNA molecule within a chromosome. |

| | | |
|---|---|---|
| **Q.24** | **C** | Genes are linked linearly on the same DNA molecule within a chromosome. |
| **Q.25** | **A** | Genes for Leukemia and Albinism are present on autosome 11. Hemophilia is X linked. |
| **Q.26** | **B** | Crossing over is the exchange of genetic material between non-sister chromatids of homologous chromosomes during meiosis, which results in new allelic combinations in the daughter cells |
| **Q.27** | **D** | • Chiasma is the point of contact, the physical link, between two (non-sister) chromatids belonging to homologous chromosomes. At a given chiasma, an exchange of genetic material can occur between both chromatids, what is called a chromosomal crossover, but this is much more frequent during meiosis than mitosis.<br>• A transposable element, transposons, or jumping gene is a DNA sequence that can change its position within a genome, sometimes creating or reversing mutations and altering the cell's genetic identity and genome size. |
| **Q.28** | **C** | During pachytene, the pairing of homologous chromosomes is completed. Chromosomes become thicker. Each bivalent has four chromatids, which wrap around each other. Non-sister chromatids of homologous chromosomes exchange their segments due to chiasmata formation, during the process called crossing over. |
| **Q.29** | **D** | Genes can be mapped on a chromosome on the basis of their recombination frequencies. |
| **Q.30** | **B** | It can be calculated by the using the following formula:<br>• Recombination frequency = Recombinant types/Sum of all combination × 100 |
| **Q.31** | **A** | XXY individual produced through non disjunctional gametes in humans is a sterile male called Klinefelter's syndrome, but the same XXY set of chromosomes in Drosophila produces a fertile female. |
| **Q.32** | **B** | It is complete androgen insensitivity syndrome, but genetically they are male. |
| **Q.33** | **C** | Hemophilia C is caused by clotting factor deficiency and its gene is on autosome. |
| **Q.34** | **D** | Partially functional opsins are present in protanomalous |
| **Q.35** | **C** | Blue color blindness is an autosomal disorder. |
| **Q.36** | **D** | Abnormal but partially functional green open causes anomaly of green color. |
| **Q.37** | **B** | The gene for blue opsin is present on autosome 7, while the genes for red and green opsins X chromosome. So, a person with recessive alleles for blue opsin cannot perceive blue color but can normally perceive green and red colors. |
| **Q.38** | **C** | Since, the female is carrier and her husband is red blind, so 50% of their children can inherit red color blindness. And 50% of their children will be normal phenotypically. |
| **Q.39** | **B** | Mineralization of bone needs vitamin D to deposit calcium. |
| **Q.40** | **D** | A condition caused by deficiency of vitamin D, especially in infancy and childhood, with disturbance of normal ossification. |
| **Q.41** | **C** | The Earth had largely been shaped by sudden, short-lived and violent events, possibly worldwide in scope. |
| **Q.42** | **B** | To make flagella prokaryotic amoeboid host cell engulfed spirochete bacteria and developed flagella on its body |
| **Q.43** | **C** | Lamarck stated that giraffe stretch their neck for browsing purpose to overcome shortage of grass. |
| **Q.44** | **C** | Somatic changes due to environmental factors are not due to evolution. |

| | | |
|---|---|---|
| Q.45 | B |  |
| Q.46 | D | Darwinism is a theory of evolution based upon inherited variations in organisms and natural selection of fitter variants to produce species adapted to their habitats. |
| Q.47 | C | Natural selection is a process whereby organisms better adapted to their environment tend to survive and produce more offspring. |
| Q.48 | A | Land distribution of organisms on the different islands and comparison of fossils provided Darwin to form evolution theory. |
| Q.49 | D | Two structures do not look similar or have the same function, genetically, they come from the same structure of the last common ancestor. |
| Q.50 | C | The development of an organism (ontogeny) expresses all the intermediate forms of its ancestors throughout evolution. |
| Q.51 | A | Alleles are partners of a gene pair which are present on homologous chromosomes. An organism can be homozygous (same alleles) or heterozygous (different alleles) with respect to alleles. |
| Q.52 | B | Genetic makeup of a trait depends on the types of genes one possess for a specific phenotype. Genome is full sets of genes of an organism. |
| Q.53 | B | Alternative form of a gene is called alleles. |
| Q.54 | C | Alleles are partners of a gene pair on homologous chromosomes. |
| Q.55 | D | All traits of an individual are control by specific sequence of nucleotides present on DNA. |
| Q.56 | B | Number of chromosomes in somatic cell of pea is 14. |
| Q.57 | D | Green pod color, round shaped seeds and axial position of the flowers in P. sativum are dominant characters while wrinkled seed shape is a recessive character. |
| Q.58 | C | According to Mendel Particulate hereditary factors responsible to control traits. Johannsen used the term gene. |
| Q.59 | C | Mendel's law of Segregation states that 'allele pairs |
| Q.60 | B | In F2 generation of Mendel's dihybrid cross, the total number of genotypes obtain will be 9. |
| Q.61 | B | Albinism is condition which appears in homozygous organisms only. |
| Q.62 | B | Dominance is a relationship between partner alleles on homologous chromosomes. |
| Q.63 | A | Alleles are partners of a gene pair. In heterozygous condition the allele which is not expressed is called as recessive while the one which expresses in heterozygous condition is called as dominant. |
| Q.64 | C | Dominant allele mask over its alternative form so should be expressive whatever will be the genotype. |
| Q.65 | A | Universal recipient is considering the individual having both antigens but no antibodies, so, their antibody doesn't interact with donor's antigens. |

| | | |
|---|---|---|
| **Q.66** | **C** | Human ABO blood groups system is controlled by three alleles e.g. $I^A$, $I^B$, i. |
| **Q.67** | **A** | ABO 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. |
| **Q.68** | **D** | H gene encodes H- substance which is necessary for the production of antigen A or antigen B on the surface of RBC's. |
| **Q.69** | **C** | Cross (a hybrid) with one of its parents or an organism with the same genetic characteristics as one of the parents. |
| **Q.70** | **A** | • A sex-linked trait is a trait that is controlled by a gene located on the sex chromosomes.<br>• Sex influenced traits occur in both males and females but it is more common in one sex.<br>• Sex limited traits are the traits that are limited to only one sex due to anatomical differences. |
| **Q.71** | **C** | Hemophilia, color blindness and Lesch-Nyhan syndrome are examples of X-linked recessive traits while Vit. D resistant rickets is an example of X-linked dominant trait. |
| **Q.72** | **B** | Haemophilia A is due to abnormality of factor VIII, while haemophilia C is due to XI. |
| **Q.73** | **D** | As mother is carrier, father is diseased and disease is X-linked recessive trait, so the chance of child being colour blind is 50 %. |
| **Q.74** | **B** | Hemophilia A, Red green color blindness and tfm syndrome are X linked recessive traits. |
| **Q.75** | **D** | Hypophosphatemic rickets is caused by communication failure that doesn't allow deposition of calcium on bones. |
| **Q.76** | **D** | Pattern baldness is an example of sex influenced traits. |
| **Q.77** | **C** | Pattern baldness is an autosomal trait. A heterozygous female will not get bald but a heterozygous male will get bald. |
| **Q.78** | **B** | In Creationism, special creation is a theological doctrine which states that the universe and all life in it originated in its present form by unconditional fiat or divine decree. |
| **Q.79** | **C** | He sent his theory of natural selection to Darwin |
| **Q.80** | **C** | Archaeobacteria are thermophiles and can tolerate high temperatures. |
| **Q.81** | **C** | According to hydrothermal vent hypothesis, prokaryotic life starts deep in ocean in underwater hot springs called hydrothermal vents. |
| **Q.82** | **D** |  |

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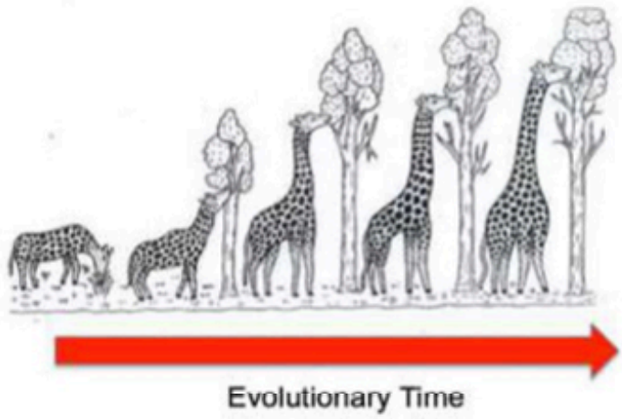
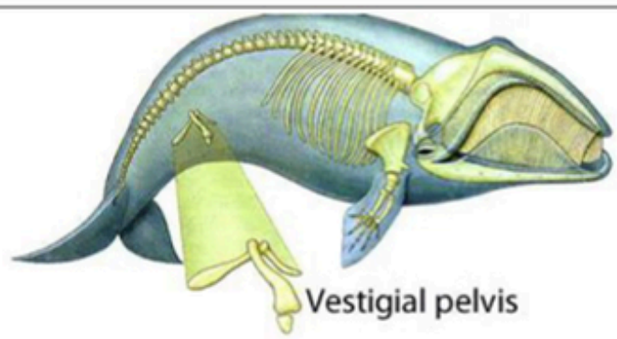
|---|---|---|
| **Q.83** | **C** |  |
| **Q.84** | **B** | According to Lamarckism organisms passes their acquired characters to the next generation as inheritance. This concept is not acceptable. |
| **Q.85** | **B** | An organism can pass on characteristics that it has acquired during its lifetime to its offspring. |
| **Q.86** | **B** | Over production in a population leads to the competition for limited resources intraspecifically as well as interspecifically. |
| **Q.87** | **C** | Reproductive Ability (Tendency for geometric increase in number) + Environmental Restrictions (Limited resources) → Struggle for Existence (Competition) + Heritable Variations → Natural Selection (Persistence of adaptive traits) + Environmental Changes → Evolution (Change in a trait) |
| **Q.88** | **A** | Darwin claimed that there was a continual struggle for existence in nature, in which only the fittest would survive with best genetic makeup. |
| **Q.89** | **A** | Changes in germ line cells are the real basis of evolution, contrary to Lamarck who explained changes only in somatic cells |
| **Q.90** | **D** | Darwin's theory of evolution when collaborated with Mendelian genetics was a turning point and led to theory of Modern synthesis. |
| **Q.91** | **D** | Neo-Darwinism deals with the molecular basis of evolution explained for the study of genetics, a promulgation of both Darwin and Mendel. |
| **Q.92** | **A** | It is an established fact that reptiles have evolved from amphibians by undergoing the changes and have become fully terrestrial. Reptiles flourished throughout Mesozoic era (225-65 million years). The climate which had been suitable for reptiles in that period, became less favorable to them in tertiary period |
| **Q.93** | **B** | Same function of the organs show the evolution of organism at a convergent point. Wings of bat, butterfly and bird shows the analogous organ relationship. |
| **Q.94** | **C** | Convergent evolution is the process in which organisms which are not closely related , independently evolve similar traits as a result of having to adapt to similar environments. |
| **Q.95** | **D** | Two structures do not look similar or have the same function, genetically; they come from the same structure of the last common ancestor |

| | | |
|---|---|---|
| **Q.96** | **B** |  |
| **Q.97** | **C** | Vestigial organs are that organs which were functional in ancestors but in descendants they are not functional but they are present. |
| **Q.98** | **D** | Convergent evolution is the process in which organisms which are not closely related, independently evolve similar traits or analogous organs as a result of having to adapt to similar environments. |
| **Q.99** | **A** | Gill pouches in vertebrates are structurally similar but are functionally different. |
| **Q.100** | **C** | Cytochrome c is the indication of common ancestry of aerobic organisms. |

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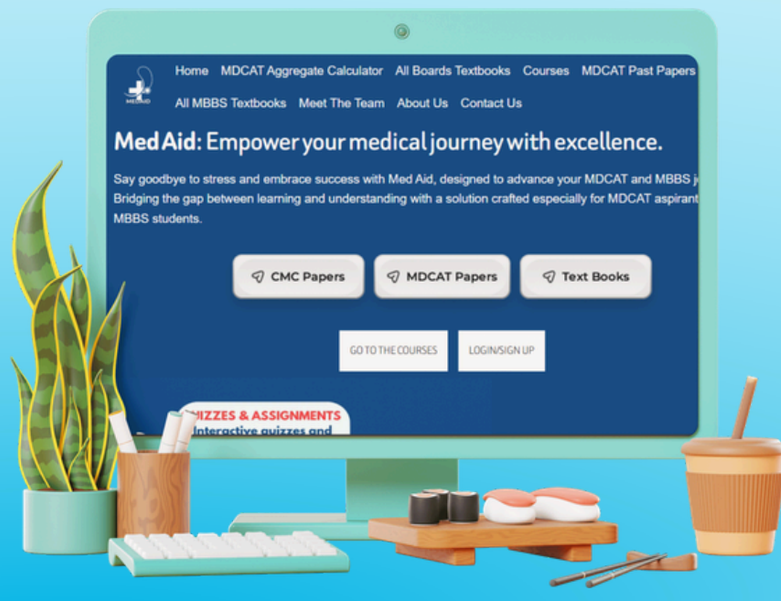


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