

## BIOLOGY MCQ'S

1. Tay-sachs disease results due to lack of enzyme-
  - (a) Glucokinase
  - (b) Hexosaminidase A
  - (c) Pyruvate kinase
  - (c)  $\text{Na}^+ - \text{K}^+$  ATPase
1. (b) Tay-sachs is a disease which begins to show neurological impairment and psychomotor difficulties. Tay-sachs disease results from a lack of the enzyme hexosaminidase A and the subsequent storage of its substrate a glycosphingolipid in lysosomes.
2. Cystic fibrosis is a disease in which-
  - (a)  $\text{Na}^+$  ions fail to pass through plasma membrane
  - (b)  $\text{Cl}^-$  ions fail to pass through plasma membrane
  - (c)  $\text{K}^+$  ions fail to pass through plasma membrane
  - (d) (a) and (b) both
2. (b) Cystic fibrosis is a common lethal genetic disease among caucasians in the united states. In this lethal disease chloride ions ( $\text{Cl}^-$ ) fail to pass through plasma membrane channels in these patients.
3. A promoter gene defines the
  - (a) Site for initial binding of RNA polymerase
  - (b) Direction of transcription
  - (c) Copying the strand
  - (d) All of the above
3. (a) When promoter gene is turned on by binding RNA Polymerase then transcription by structural genes takes place.
4. The posterior part of the retina which is just opposite to the lens is called
  - (a) Cornea
  - (b) Yellow spot
  - (c) Area centralis
  - (d) B and C both
4. (b) The posterior part of the retina which is just opposite to the lens is called area centralis or yellow spot which contains only cones and has yellow pigment, the image are normally focussed on this area.
5. Uriniferous tubules posterior part of the kidney open into the
  - (a) Vas deferens
  - (b) Bidder's canal
  - (c) Vesicula seminalis
  - (d) Wolfian duct
5. (b) From each testis several thin vasa efferentia emerge through the mesorchium end join the uriniferous tubules of the posterior part of the kidney to open into the Bidder's canal of the kidney which turn opens into the ureter.
6. The Bowman's capsule along with its glomerulus is called
  - (a) Corpuscle tubules or Malpighian body
  - (b) Distal convoluted tubule
  - (c) Seminiferous tubule
  - (d) Uriniferous tubule
6. (a) The Bowman's capsule along with its glomerulus is called malpighian body or corpuscle tubule then opens into the collecting tubule which finally opens into the ureter.
7. Which one is correct about autonomic nervous system
  - (a) It is partly independent and not under voluntary control
  - (b) It is partly independent and not under involuntary control
  - (c) It is fully independent and not under involuntary control
  - (d) It is fully dependent and not under voluntary control
7. (a) Pancreatic juice is a watery alkaline fluid containing three powerful enzymes called trypsinogen, amylpsin, trypsin

8. Interphase
- Is the same as prophase, metaphase anaphase and telophase
  - Include stages  $G_1$ , S and  $G_2$
  - Requires the use of polar fibres and kinetochore fibres
  - Rarely occurs
8. (b) Interphase is a resting stage of the cell. It includes  $G_1$ , S and  $G_2$  stages. During the  $G_1$  stage the cell grows in size and the cellular organelles increase in number. During the  $G_2$  stage various metabolic events occur in preparation for mitosis. S is the synthetic phase.
9. In which phase of mitosis the chromosome move forward the poles ?
- Prophase
  - Metaphase
  - Telophase
  - Anaphase
9. (d) At the start of anaphase, the centromere of each duplicated chromosome divides. Daughter chromosomes each with a centromere and single chromatid, begin to move toward opposite poles.
10. Electron transport system is located in
- Mitochondrial matrix
  - Cytosol
  - Cristae
  - All of the above
10. (c) The electron transport system is located in the cristae of the mitochondria is a series of carriers that pass electrons from one to the other.
11. Which one is correct about glycolysis?
- Breakdown of glucose to two molecules of pyruvate
  - Occurs in cytoplasm
  - Two  $NAD^+$  accept two electrons and become NADH
  - All of the above
11. (d) Glycolysis is the breakdown of glucose to two molecules of pyruvate. This pathway is a series of enzymatic reactions that occur in the cytosol. Two  $NAD^+$  accepts two electrons and become NADH. Then substrate level phosphorylation produces a net gain of two ATP molecules. The NADH either gives electrons to pyruvate or takes them to mitochondria.
12. A phosphate bond contains an energy :
- 7.3 k cal
  - 10 k cal
  - 8.3 k cal
  - 11.7 k cal
12. (a) An ATP phosphate bond has energy content of 7.3 k cal, and 36 of these are produced during glucose breakdown. 36 phosphates are equivalent to a total of 263 k cal.
13. In anaerobic respiration the process takes place is :
- Kreb's cycle
  - Glycolysis
  - Oxidative phosphorylation
  - Glycolysis and Kreb's cycle
13. (b) During fermentation, the hydrogen atoms are generated by glycolysis and  $NAD^+$  is regenerated to obtain ATP. Certain animal cell, deprived of oxygen, temporarily carry out lactic acid fermentation.
14. Most of the energy during aerobic respiration is produced by the
- Electron transport chain
  - Glycolysin
  - Kreb's cycle
  - Oxidative phosphorylation
14. (a) Most of the energy harvested during aerobic respiration is produced by the electron transport chain. In total the oxidation of one molecule of glucose results in the net production of 36 ATP molecules.

15. Estuaries formed where
- Fresh water meets sea water
  - Marine water meets lake water
  - River water meets lake water
  - Fresh water meets lake water
15. (a) Estuaries occur where fresh water meets sea water and the salinity of sea water is diluted.
16. In the sexual reproduction of *Spirogyra*, the cell contents contract from cell walls to form
- The zoospores
  - The zygospores
  - The gametophytes
  - The gametes
16. (d) The sexual reproduction in ***Spirogyra*** is called **conjugation**. The cell contents taking part in development of gametangia become separated from the cell wall and shrink and ultimately are converted into gametes. The fusion of these gametes results into the formation of **zygospore**.
17. Sexual reproduction is found in all the classes of algae except
- Cyanophyceae
  - Chlorophyceae
  - Rhodophyceae
  - Phaeophyceae
17. (a) In cyanophyceae reproduction takes place by vegetative and asexual methods. Vegetative reproduction takes place by cell division, fragmentation and **hormogonia** formation. Asexual reproduction is by akinetes, endospores, exospores, heterocysts and nannocysts.
18. All algae have (two pigments-common in all-groups of algae)-
- Chlorophyll *a* and chlorophyll *b*
  - Chlorophyll *b* and carotenes
  - Chlorophyll *a* and carotenes
  - Phycobilin *b* and carotenes
18. (c) There are five types of chlorophylls, viz., chl. a, b, c, d, and e. Of these chlorophyll a is present in all groups of algae. Similarly, carotenes are also of five types, i.e.,  $\alpha$ -carotene,  $\beta$ -carotene,  $\gamma$ -carotene, E-carotene and flavacene. At least one of them is present in all the members of algae.
19. Diplanetism is exhibited by-
- Saprolegnia*
  - Rhizopus*
  - Ulothrix*
  - Vaucheria*
19. (a) In *Saprolegnia*, asexual reproduction takes place by zoospores which are produced in zoosporangium. These zoospores are pearshaped, biflagellate and are known as **primary zoospores**. The zoospores withdraw their flagella and secrete a thick wall. These resting zoospores are termed as **primary cysts**. During favourable conditions, the cysts germinate and produce biflagellate kidney shaped **secondary zoospores**, which produce new mycelia on germination. This phenomenon of the production of two types of zoospores (primary and secondary ) is know as **diplanetism** and these zoospores as **diplanetic**.
20. Which one of the following fixes CO<sub>2</sub> into carbohydrates ?
- Rhizobium*
  - Bacillus*
  - Nitrobacter*
  - Rhodospirillum*
20. (d) Rhodospirillum is a non sulphur bacteria utilizes non sulphur compound like alcohol, organic acid for as hydrogen donor for CO<sub>2</sub> fixation.
21. The ferns, in which the entire sporangium develops from a single superficial cell of the sporophyll is known as
- Leptosporangiate
  - Eusporangiate
  - Unisporangiate
  - Mesosporangiate
21. (a) Two types of sporangia are formed in the vascular plants. In case of eusporangiate development, the sporangium develops from a superficial group of parent initials, while leptosporangiate sporangium originates from a single superficial parent initial.



27. The resin duct of a gymnospermous stem is an example of
- (a) Intercellular space (b) Schizogenous cavity  
(c) Lysigenous cavity (d) Big vacuole
27. (b) The young cells are closely packed and there are no spaces between them. As the cells grow, either their walls separate apart from one another or some cells are destroyed at some places, due to which cavities are formed between the cells. If cavities are formed due to separation of cells from one another, are called **schizogenous cavities**, e.g., Resin canals in *Pinus*.
28. The ovules of Cycas are
- (a) Orthotropous and unitegmic (b) Orthotropous and tritegmic  
(c) Anatropous and unitegmic (d) Anatropous and tritegmic
28. (a) The ovules of Cycas are erect. The micropyle, chalaza and funicle lie in one straight line. Such ovules are termed as **orthotropous**. The main body of ovule is nucellus covered over by a **single** thick **integument** (unitegmic) except at the apex of ovule, which forms micropyle.
29. Perisperm is
- (a) Surviving nucleus in the seed (b) Outgrowth of the outer integument  
(c) Outgrowth of funiculus (d) Both (b) and (c)
29. (a) In pinus, along with embryo development, various parts of the ovule, outside the female gametophyte (endosperm), undergo several changes by which the ovule is transformed into seed. Due to the growth of endosperm, most of the nucellus is absorbed by the endosperm itself, as it supplies nutrition to it, and the remaining part of the nucellus is pressed towards outside (towards integument) and persist only in the form of a thin brownish layer known as **perisperm**.
30. Soil particles arranged in order of increasing sizes are
- (a) Clay, silt & sand (b) Clay, sand and silt  
(b) Silt, sand & clay (d) Sand, silt and clay
30. (a) The 'International Society of Soil Science' has fixed different names for particles of different sizes
- | Name of particles | Diameter           |
|-------------------|--------------------|
| Gravel            | 5.000 mm           |
| Fine Gravel       | 2.000 mm           |
| Coarse Sand       | 0.200 mm           |
| Fine Sand         | 0.020 mm           |
| Silt              | 0.002 mm           |
| Clay              | Less than 0.002 mm |
- The relative proportion of the above particles determine the texture of the soil.
31. Root cap is formed from
- (a) Fascicular cambium (b) Calyptragen  
(c) Wound cambium (d) Protoderm
31. (b) The root-cap normally arises from the **fourth histogen**, which is known as the **Calyptragen**.
32. Which of the following is a macronutrient ?
- (a) Manganese (b) Copper  
(c) Magnesium (d) Zinc
32. (c) Out of so many elements present in the plant body Sachs (1860) and Knop (1865) suggested that elements like **C, H, O, N, P, K, S, Ca, Mg** and **Fe** are absolutely essential for the growth of the plant and they are required in larger amount. These elements are called **macroelements or macronutrients**.
33. The primary acceptor of CO<sub>2</sub> in C<sub>3</sub> plants is
- (a) Pyruvic acid (b) PEP  
(c) RuBP (d) AT

33. (c) The studies conducted on *Chlorella* and *Scenedesmus* with the help of radioactive tracer technique by Calvin and coworkers (1954) revealed that the initial acceptor of CO<sub>2</sub> in C<sub>3</sub> plants is a 5- carbon compound **Ribulose -1, 5 -biphosphate (RuBP)**.
34. Essential oils are those which  
 (a) Are essential to the plant itself  
 (b) Are used as lubricants  
 (c) Produce perfumes  
 (d) Are essential for human beings
34. (c) **Essential oils**-These are volatile oils and possess strong aromatic smell.
35. Cytochromes are found in  
 (a) Matrix of mitochondria (b) Cristae of mitochondria  
 (c) Lysosomes (d) Outer wall of mitochondria
35. (b) A mitochondria consists of two membranes, an outer membrane and an inner membrane. The inner membrane or cristae contains electron carrier molecules (cytochromes), succinic dehydrogenase, ATP-synthetase etc.
36. Single stranded DNA is found in  
 (a) Coliphage  $\phi \times 174$  virus (b) Reovirus  
 (c) Wound tumor virus (d) TMV
36. (a) Normally DNA has a double helical structure with two poly nucleotide chains connected by hydrogen bonds and running in opposite directions. However, in coliphage  $\phi \times 174$  virus it is found to be only single stranded, i.e., composed of only one polypeptide chain.
37. Lysosomes are the  
 (a) Digestive centres (b) Respiratory centres  
 (c) Excretory centres (d) Energy centres
37. (a) Lysosomes were first observed by De Duve. The process of digestion is carried out within the lysosome and digest most of the biological substances. If lysosomes are injured by a toxic substance the whole cell, hence lysosomes are called '**Suicidal bags**', due to the presence of hydrolytic enzymes.
38. Diploxylic vascular bundles are found in-  
 (a) Pteris (b) Selaginella  
 (c) Funaria (d) Cycas
38. (d) In the midrib of *Cycas* leaflet a large vascular bundle is present. It is collateral and closed. The xylem is mesarch, collateral having **centripetal xylem** with metaxylem and protoxylem above and two patches of centrifugal xylem on each side of protoxylem of **centripetal xylem**. Such an arrangement of centripetal and centrifugal xylem is called diploxylic condition.
39. Neo-Darwinism was given by  
 (a) Charles Darwin (b) Hugo de vries  
 (c) Dobzansky (d) Wagner
39. (c) Modern concept of evolution is a modification of Darwin's theory of natural selection by replacing favourable variations with genetic variation or mutation. It is often called Neo-Darwinism or synthetic theory. Some of the important workers, who have contributed to the modern **synthetic theory** or **Neo-Darwinism** are Dobzansky, Fisher, Haldane, Sewall Wright Mayer and Stebbins.
40. DNA replication is  
 (a) Continuous and conservative  
 (b) Discontinuous and semiconservative  
 (c) Semidiscontinuous and semiconservative  
 (d) Conservative and semidiscontinuous

40. (c) Evidences prove that DNA replication is **semi-conservative** type. At the same time it is also found to be semi-discontinuous, because **leading strand** is synthesized continuously, while **LAGGING STRAND** discontinuously. Therefore, the replication of DNA molecule is semi-conservative as well as semidiscontinuous.
41. Which of the following is called amber ?  
 (a) AUG (b) UAA  
 (c) UAG (d) UGA
41. (c) Out of 64 possible triplets of genetic code, three codons, namely UAA, UAG and UGA are designated as **termination codons**. Till the function of these codons was discovered, they were called nonsense codons, since they did not code for any of the 20 essential amino acids. These three termination codons, viz., UAA, UAG and UGA are known as **Ochre**, **Amber** and **Opal** respectively.
42. Initiation of polypeptide chain in protein synthesis is induced by  
 (a) Methionine (b) Glycine  
 (c) Leucine (d) Lysine
42. (a) The initiation of polypeptide chain in prokaryotes is always brought about by the amino acid methionine, which is coded by the codon AUG as the initiation codon. In E. coli, there are two t-RNA's for mention  
 (i) t-RNA<sub>m</sub><sup>met</sup> (non formylatable) deposits methionine at the intercalary positions and  
 (ii) t-RNA<sub>f</sub><sup>met</sup> (formylatable) deposits methionine as the first amino acid. In eukaryotes there is only one type of t-RNA depositing methionine as the first amino acid and also at the intercalary positions.
43. Which of the following is a test cross ?  
 (a) Tt × Tt (b) Tt × tt  
 (c) Tt × TT (d) TT × tt
43. (b) The cross, in which the F<sub>1</sub> hybrid is crossed back with its recessive parent, is called a **test cross**.
- Test Cross**
- $$\begin{array}{ccc} \text{♀ } Tt & \times & tt \text{ ♂} \\ \text{F}_1 \text{ hybrid} & & \text{Recessive parent} \end{array}$$
- Back crosses :**
- (i) 
$$\begin{array}{ccc} \text{♀ } Tt & \times & tt \text{ ♂} \\ \text{F}_1 \text{ hybrid} & & \text{Recessive parent} \end{array}$$
- (ii) 
$$\begin{array}{ccc} \text{♀ } Tt & \times & TT \text{ ♂} \\ \text{F}_1 \text{ hybrid} & & \text{Dominant parent} \end{array}$$
44. In soil, water available for plants is  
 (a) Capillary water (b) Hygroscopic water  
 (c) Gravitational water (d) Chemical bound water
44. (a) Part of the rain water is held in the soil spaces, which is called capillary water.
45. Velamen is needed for  
 (a) Respiration of plants (b) Protection of tissue  
 (c) Absorption of moisture (d) None of the above
45. (c) Velamen is the outermost tissue of the root. The cells of this tissue are large, closely packed with fibrous thickenings. These are dead cells filled with air in dry season and during rains, they absorb water and moisture from surrounding atmosphere.

46. Linnaeus gave a system of nomenclature called-
- (a) Binomial
  - (b) Artificial system
  - (c) Natural system
  - (d) Phylogenetic system
46. (a) Carlus Linnaeus (1707-1778) , who is rightly known as “**Father of Modern Botany** “ published a number of books . His “**Species Plantarum** “ was published in 1753, in which he introduced the consistent use of the **binomial system** of plant name , i.e., the name of a species consists of the name of the genus followed by the specific **epithet**.
47. Exchange of segments between non-homologous chromosomes is called
- (a) Inversion
  - (b) Duplication
  - (c) Translocation
  - (d) Deletion
47. (c) Translocations are the chromosomal aberrations, responsible for unilateral or bilateral transfer of chromosome segments from one chromosome to another. The segmental interchanges involving mutual exchange of chromosome segments between two pairs of non-homologous chromosomes are known as **reciprocal translocations**.