

WBJEE-2014
BIOLOGY
Question with Solution

CATEGORY - I

Q.1 to Q.60 carries one mark each, for which only one option is correct. Any wrong answer will lead to deduction of 1/3 mark.

1. One molecule of triglyceride is produced using
(A) One fatty acid and one glycerol
(B) One fatty acid and three glycerols
(C) Three fatty acids and three glycerols
(D) Three fatty acids and one glycerol

Ans : (D)

Solution : One molecule of triglyceride is produced by three molecules of fatty acids and one molecule of glycerol. Triglyceride (triacylglycerol, TAG or triacylglyceride) is an ester composed of a glycerol bound to three fatty acids. It is the main constituent of vegetable oil and animal fats. Most of the fats digested by humans are triglycerides. Triglycerides are formed from a single molecule of glycerol, combined with three molecules of fatty acid. The glycerol molecule has three hydroxyl (OH-) groups. Each fatty acid has a carboxyl group (COOH-). In triglycerides, the hydroxyl groups of the glycerol join the carboxyl groups of the fatty acid to form ester bonds.

2. Glutenin is an important protein in
(A) Potato
(B) Wheat
(C) Soybean
(D) Spinach

Ans : (B)

Solution : Glutenin is a storage protein present in wheat. The unique breadmaking properties of wheat are generally ascribed to the visco-elastic properties of its gluten proteins. While monomeric gluten proteins (gliadin) show viscous behavior, polymeric gluten proteins (glutenin) are elastic. The unique elasticity of glutenin results to a large extent from its polymeric nature. Glutenin is a highly heterogeneous mixture of polymers consisting of a number of different high- and low-molecular-weight glutenin subunits linked by disulfide bonds.

3. Which one of the followings is enriched with a non-reducing sugar ?
(A) Grapes
(B) Germinating barley grains
(C) Table sugar
(D) Mother's milk

Ans : (C)

Solution : Table sugar, such as cane sugar or white sugar, the technical term of which is sucrose, is a non-reducing sugar. It is composed of the combination of one glucose molecule and one fructose molecule. The reason that sucrose is a non-reducing sugar is that it has no free aldehyde or

keto group. Additionally, its anomeric carbon is not free and can't easily open up its structure to react with other molecules.

4. Select the CORRECT statement related to mitosis
- (A) Amount of DNA in the parent cell is first halved and then distributed into two daughter cells
 - (B) Amount of DNA in the parent cell is first doubled and then distributed into two daughter cells
 - (C) Amount of DNA in the parent cell is first halved and then distributed into four daughter cells
 - (D) Amount of DNA in the parent cell is first doubled and then distributed into four daughter cells

Ans : (B)

5. The frequency of crossing-over occurring between two genes located on the same chromosome depends on
- (A) Length of the chromosome
 - (B) Position of the centromere
 - (C) Activities of two genes
 - (D) Distance between two genes

Ans : (D)

Solution : Frequency of crossing-over is directly proportional to the distance between two genes. probability of a crossover between two genes is proportional to the distance between the two genes. That is, the greater the distance between the two genes, the greater the probability that a crossover will occur between them during meiosis.

6. Chlorophyll molecules are located in the
- (A) Thylakoid membrane
 - (B) Thylakoid lumen
 - (C) Stroma
 - (D) Inner chloroplast membrane

Ans : (A)

7. The primary cell wall is mainly made up of
- (A) Lignin
 - (B) Pectin
 - (C) Cellulose
 - (D) Protein

Ans : (C)

8. Which of the following statements is wrong for sucrose ?
- (A) It is a disaccharide
 - (B) It is a non-reducing sugar
 - (C) It accumulates in the cytoplasm
 - (D) It is comprised of maltose and fructose

Ans : (D)

Solution : Sucrose is a disaccharide composed of glucose and fructose.

9. Which of the followings is always ABSENT in prokaryotic cells?
(A) Ribosome (B) Mitochondria (C) DNA (D) Cell wall

Ans : (B)

10. Which of the following tissues provide maximum mechanical support to plant organs ?
(A) Sclerenchyma (B) Collenchyma (C) Parenchyma (D) Aerenchyma

Ans : (A)

Solution: It is thick walled, lignified dead mechanical tissue

11. The Respiratory Quotient (RQ) of glucose is
(A) 0.5 (B) 0.7 (C) 1.0 (D) 1.5

Ans : (C)

Solution: The respiratory quotient of glucose is 1.0. In metabolic measurements made via indirect calorimetry, the respiratory quotient is the ratio of the carbon dioxide produced to the oxygen consumed. An RQ of 1.0 indicates carbohydrates are being burned, while an RQ of 0.7 indicates that fats are being burned.

12. Cross-pollination through insect agent is called
(A) Anthropophily (B) Malacophily (C) Entomophily (D) Ornithophily

Ans : (C)

13. Cleistogamous flowers are
(A) Bisexual flowers which remain opened (B) Bisexual flowers which remain closed
(C) Open female flower (D) Open male flower

Ans : (B)

Solution: Cleistogamous flowers — inconspicuous, apetalous bisexual flowers that never open and are self-pollinating. The anthers are suppressed to the stigma, which ensures a seed set.

14. Which one of the following is a growth regulator produced by plants?
(A) Naphthalene acetic acid (B) Zeatin
(C) 2, 4-Dichlorophenoxyacetic acid (D) Benzyl aminopurine

Ans : (B)

Solution : Zeatin belongs to the family of natural plant growth regulator called cytokinin.

15. In apple, the edible portion is
(A) Mesocarp (B) Epicarp (C) Endocarp (D) Thalamus

Ans : (D)

16. Anish is having colour-blindness and married to Sheela, who is not colour-blind. What is the chance that their son will have the disease ?
(A) 100% (B) 50% (C) 25% (D) 0%

Ans : (D)

Solution : According to the question, Sheela is not colour blind so, her genotype is XX and the colour blind Anish has the genotype X^cY .

17. Insect pest resistant Bt-cotton plant was developed using
(A) Somaclonal variation (B) Micropropagation
(C) Somatic hybridization (D) Transgenic technology

Ans : (D)

Solution : Bt cotton was produced by transgenic technology in which *cry* gene was introduced into cotton plant genome. This gene was obtained from *Bacillus thuringiensis*.

18. In which one of the followings, expenditure of energy is required ?
(A) Osmosis (B) Diffusion (C) Active transport (D) Passive transport

Ans : (C)

Solution : Active transport requires expenditure of energy since, it occurs against the concentration gradient.

19. Emasculation ensures cross-pollination in
(A) Staminate flower (B) Bisexual flower (C) Neuter flower (D) Pistillate flower

Ans : (B)

Solution: The purpose of emasculation is to prevent self-fertilization in the flowers of female parent. But emasculation is essential in bisexual flowers. In species with relatively large flowers, hand emasculation may be adequate in most hybridization programmes.

20. The protein component of a holoenzyme is known as
(A) Coenzyme (B) Cofactor (C) Prosthetic group (D) Apoenzyme

Ans : (D)

Solution : Protein part of a conjugated or holoenzyme is called as apoenzyme. Non-protein part is called as co-factor.

21. Pseudopodia are produced by
(A) Plasma Cell (B) Mast Cell (C) Adipose Cell (D) Fibroblast Cell

Ans : (D)

Solution : Protoplasmic processes of fibroblast can act as pseudopodia, supported by axial filaments. They are lamellipodia.

22. Formation of polysome does not require
(A) rRNA (B) mRNA (C) tRNA (D) snRNA

Ans : (D)

23. K_m is
(A) Product (B) Enzyme (C) Constant (D) Unit

Ans : (C)

Solution : K_m is Michaelis-Menten constant. It indicates substrate concentration at which rate of reaction is half of the maximum velocity.

24. Proteins helping in Kinetocore formation of yeast are
(A) CBF2 and Kar^3P (B) CBF2 and CBF3
(C) CBF3 and Kar^3P (D) CBF2, CBF3 and Kar^3P

Ans : (D)

25. Juvenile hormone in insects is released from
(A) Protocerebrum (B) Corpora Cardiaca (C) Corpora Allata (D) Thoracic Gland

Ans : (C)

Solution : Juvenile hormone (JH) is secreted by two tiny glands behind the brain, the corpora allata. It ensures the retention of juvenile characters. As long as there is enough JH, ecdysone promotes larva-to-larva molts. With lower amounts of JH, ecdysone promotes pupation. Complete absence of JH results in formation of the adult.

26. Genes which are located only in the X-Chromosome are known as
(A) Epistasis genes (B) Holandric genes (C) Operator genes (D) Antiepistasis genes

Ans : (A)

Solution : None of the options are 100% correct.

- Genes which are located on X-chromosome only are called **hologynic genes** and those found on Y-chromosome only are called **holandric genes**.
- **Operator genes** - a gene that activates the production of messenger RNA by adjacent structural genes.
- **Epistasis genes** is the most probable option though none of the options seem appropriate. According to Barr Body concept (applicable only for X-chromosomes) genes present on the Barr body (inactive X-chromosome) are at times hypostatic due to presence of epistatic genes on the active X-chromosome.

27. Industrial Melanism is an
(A) Effect of industrial pollution (B) Effect of mutation
(C) Evidence of survival of fittest (D) Evidence in favour of Natural Selection

Ans : (D)

Solution : Industrial melanism is an effect of urban pollution known to be prominent in many different species of arthropods. Industrial melanism is a term explaining the phenomenon of an organism evolving a dark pigmentation when exposed to an environment that is polluted by dark soot deposit and sulfuric buildup from industrial pollution. In these types of cases of industrial melanism, the darker pigmented individuals develop a higher fitness and are favored by natural selection. Thus Industrial melanism is an evidence of Natural Selection but industrial pollution acted as the selective factor.

28. The concept of Hot-Spot was first introduced by
(A) Mayer (B) Simpson (C) Myers (D) David

Ans : (C)

Solution: The concept of biodiversity hotspots was originated by **Norman Myers**. A biodiversity hotspot is a bio-geographic region with a significant reservoir of **biodiversity** that is under threat from humans.

29. With the rise of water temperature, dissolved oxygen
(A) Remains unchanged (B) Increases in amount
(C) Decreases in amount (D) Is more available to the aquatic organisms

Ans : (C)

30. Intermediate host of malarial parasite is
(A) Pig (B) Man (C) Mosquito (D) Larva of Mosquito

Ans : (B)

Solution : Man is the intermediate host for malarial parasites. In this host the asexual reproduction takes place, or the larval stages of animal parasites develops. When development of larval stage takes place in two different hosts they are called 'first' and 'second' intermediate hosts. Man is both definitive and intermediate host for *Taenia solium* and *Trichinella spiralis*.

31. Which codon is not an indicator of completion of protein synthesis ?
(A) UAG (B) AUG (C) UAA (D) UGA

Ans : (B)

32. 'Kyoto Protocol' is a multination international treaty for
(A) Phasing out green house gases (B) Controlling ozone destroying substances
(C) Management of hazardous wastes (D) Conservation of biodiversity

Ans : (A)

Solution: The **Kyoto Protocol** to the United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty that sets binding obligations on industrialized countries to reduce emissions of greenhouse gases.

33. The objective of 'Ramsar Convention' was
(A) Forest conservation (B) Wildlife conservation
(C) Wetland conservation (D) Biodiversity conservation

Ans : (C)

Solution : The Ramsar Convention (formally, the Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilization of wetlands,^[1] recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. It is named after the city of Ramsar in Iran, where the Convention was signed on 2nd Feb 1971 (Iran) & effective from 21st December, 1975.

34. Which of the following human parasites require mosquito to complete their life-cycle ?
(A) *Ascaris lumbricoides* and *Wuchereria bancrofti*
(B) *Leishmania donovani* and *Plasmodium ovale*
(C) *Ascaris lumbricoides* and *Leishmania donovani*
(D) *Wuchereria bancrofti* and *Plasmodium ovale*

Ans : (D)

Solution : *Wuchereria bancrofti* requires female *Culex* and *Plasmodium ovale* requires female *Anopheles* to complete their life-cycle.

35. In which diagnostic system, Piezoelectric effect and Reverse Piezoelectric effect are involved?
(A) EEG (B) CAT (C) USG (D) MRI

Ans : (C)

Solution : In USG (Ultrasonographic) technique these effects are involved for proper diagnosis

36. Main cause of Eutrophication is
(A) Fluctuation of temperature (B) Unusual growth of aquatic vegetations
(C) Enrichment of nutrients (D) Abundance of microorganisms

Ans : (C)

Solution : Eutrophication is the enrichment of an ecosystem with chemical nutrients through fertilizers or sewage to an aquatic system, typically compounds containing nitrogen, phosphorus, or both.

37. The body of Rohu fish is covered by
(A) Cycloid scale but the tail is homocercal (B) Placoid scale but the tail is heterocercal
(C) Cycloid scale but the tail is heterocercal (D) Placoid scale but the tail is homocercal

Ans : (A)

Solution : Rohu (*Labeo rohita*) is a carp in which body is covered by cycloid scales and the tail is homocercal

38. Management of National Park is controlled by
(A) State Government (B) Central Government
(C) United Nations (D) Non-Government Organizations

Ans : (B)

39. Which one is an example of living fossil ?
(A) Coral (B) *Ascidia* (C) *Octopus* (D) King crab

Ans : (D)

Solution: King crabs, also called Horseshoe crabs are considered living fossils; they resemble fossil trilobites and eurypterids of the Paleozoic era. They are classified in the phylum Arthropoda, subphylum Chelicerata, class Merostomata, order Xiphosura.

40. The removal of 'Keystone' species will affect
(A) The producers (B) The consumers (C) The ecosystem (D) The decomposers

Ans : (C)

Solution : A keystone species is a species that has a disproportionately large effect on its environment relative to its abundance.^[1] Such species are described as playing a critical role in maintaining the structure of an ecological community, affecting many other organisms in an ecosystem and helping to determine the types and numbers of various other species in the community.

41. Objects less than 0.2 μm in size cannot be seen under light microscope because
(A) The wave length of visible light is 3900 Å to 7800 Å
(B) Only two types of lenses are used
(C) Maximum magnifying power of ocular lens is 20 X
(D) Maximum magnifying power of objective lens is 100 X

Ans : (A)

42. If the sequence of bases in the coding strand of a double stranded DNA is 5' - GTTCGAGTC-3', the sequence of bases in its transcript will be
(A) 5' - GACUCGAAC-3' (B) 5' - CAAGCUCAG-3'
(C) 5' - GUUCGAGUC-3' (D) 5' - CUGAGCUUG-3'

Ans : (C)

Solution : The sequence of transcript (i.e., RNA transcribed) is same as the coding strand except in place of thymine it is uracil.

43. Immunity that develops in the fetus after receiving antibodies from mother's blood through placenta is
(A) Naturally acquired active immunity (B) Artificially acquired active immunity
(C) Naturally acquired passive immunity (D) Artificially acquired passive immunity

Ans : (C)

Solution: Fetus receives IgG antibody from mother through the placenta so, it is naturally acquired passive immunity.

44. The serous membrane which covers the lungs is called
(A) Pericardium (B) Peritoneum (C) Perichondrium (D) Pleura

Ans : (D)

Solution: There are more than one type of pleura. Immediately surrounding the lobes of the lungs is visceral pleura. There is also a layer of parietal pleura that surrounds both the lungs and their visceral pleura. Between the visceral and parietal pleura is a potential space that contains a thin layer of mucoid liquid, that some refer to as synovial fluid, although it is not true synovial fluid. This fluid allows the two layers of pleura to slide easily against one another when the lungs inflate and deflate during respiration.

45. The volume of air that can be breathed in by maximum forced inspiration over and above the normal inspiration is called
- (A) Expiratory Reserved Volume (B) Inspiratory Reserved Volume
(C) Vital Capacity (D) Inspiratory Capacity

Ans : (B)

Solution : Volume of air that can be breathed in by maximum forced inspiration above tidal volume or normal inspiration is called as inspiratory reserve volume.

46. How many ATP are produced when one molecule of FADH₂ is oxidized to FAD through Electron Transport System?
- (A) 2 (B) 3 (C) 1 (D) 4

Ans : (A)

47. Which valve is present at the opening of coronary sinus?
- (A) Mitral valve (B) Eustachian valve (C) Thebesian valve (D) Tricuspid valve

Ans : (C)

Solution: The coronary sinus orifice is guarded by the Thebesian valve. The coronary sinus orifice (opening, also known as the ostium of the coronary sinus) is on the posterior, inferior surface of the heart, medial to the inferior vena cava opening, just superior to the septal leaflet of the tricuspid valve. The coronary sinus orifice is guarded by the Thebesian valve.

48. Which of the following organs does not produce any digestive enzymes?
- (A) Salivary gland (B) Pancreas (C) Liver (D) Stomach

Ans : (C)

Solution: Liver produces bile juice which is devoid of any digestive enzyme.

49. The disease that occurs in mature adult human being due to deficiency of calciferol is
- (A) Keratomalacia (B) Osteomalacia (C) Glossitis (D) Pernicious anaemia

Ans: (B)

Solution: Calciferol is vitamin D. Its deficiency in adult causes osteomalacia in which bone becomes weak and fragile.

Cholecalciferol, also known as calciol or vitamin D₃, is one of the three major forms of vitamin D. It is either synthesized in our skin from the precursor hormone 7-dehydrocholesterol, or acquired through diet or supplements.

It is extremely important because it is one of the controlling factors in the regulation of calcium and phosphorous concentrations. An insufficient supply of vitamin D can result in thin, porous bones that are brittle and easily breakable regardless of how much calcium and phosphorous supplements we take. Vitamin D deficient children are at higher risk of rickets, and deficiencies in adults and the elderly can lead to diseases like osteomalacia and osteoporosis.

One can prevent vitamin D₃ deficiency by combining sun exposure with adequate dietary intake. Since UV radiation is required for your skin to synthesize this vitamin, you should try to maintain at least 15 minutes of outdoor activity every day.

50. Which blood cells can engulf bacteria by phagocytosis?
(A) Eosinophil and Basophil (B) Basophil and Lymphocyte
(C) Neutrophil and Monocyte (D) Neutrophil and Lymphocyte

Ans : (C)

Solution: Neutrophil and monocyte are major phagocytic cells of immune system.

51. Which excitatory neurotransmitter is involved in the transmission of impulse at the neuromuscular junction?
(A) Epinephrine (B) Serotonin (C) Acetyl choline (D) Glycine

Ans : (C)

Solution: **Acetylcholine (Ach)** is an organic molecule that acts as a neurotransmitter in many organisms, including humans. It is an ester of acetic acid and choline, with chemical formula $\text{CH}_3\text{COO}(\text{CH}_2)_2\text{N}^+(\text{CH}_3)_3$ and systematic name **2-acetoxy-N,N,N-trimethylethanaminium**.

Acetylcholine is one of many neurotransmitters in the autonomic nervous system (ANS). It acts on both the peripheral nervous system (PNS) and central nervous system (CNS) and is the only neurotransmitter used in the motor division of the somatic nervous system. Acetylcholine is also the principal neurotransmitter in all autonomic ganglia.

52. Which area of cerebral cortex is responsible for the interpretation of speech?
(A) Brocca's area (B) Wernicke's area
(C) Premotor area (D) Association area of sensory cortex

Ans : (B)

53. Which of the following pituitary hormones is secreted without the involvement of a releasing hormone (RH)?

- (A) Thyroid Stimulating Hormone (TSH) (B) Follicle Stimulating Hormone (FSH)
(C) Oxytocin (D) Prolactin

Ans : (C)

54. Which of the following hormones is a derivative of fatty acid?

- (A) Gastrin (B) Thyroxin (C) Estrogen (D) Prostaglandins

Ans : (D)

Solution: The prostaglandins are a group of hormone-like lipid compounds that are derived enzymatically from fatty acids and have important functions in the animal body. Every prostaglandin contains 20 carbon atoms, including a 5-carbon ring.

55. Which of the followings is **NOT** involved in muscular contraction?

- (A) Calcium ion (B) Troponin (C) Actin (D) Magnesium ion

Ans : (D)

Solution: Ca^{2+} , Troponin, Actin, Myosin are directly involved in muscle contraction while Mg^{2+} ion is secondarily involved in this process.

56. Proximal convoluted tubule of nephron is responsible for

- (A) Filtration of blood
(B) Maintenance of Glomerular Filtration Rate
(C) Selective re-absorption of glucose, amino acid, NaCl and water
(D) Reabsorption of salts only

Ans : (C)

Solution: PCT of nephron is the main site for selective reabsorption of glucose, amino acids, water and different ions.

The **proximal tubule** is the portion of the duct system of the nephron of the kidney which leads from Bowman's capsule to the loop of Henle.

The proximal tubule regulates the pH of the filtrate by exchanging hydrogen ions in the interstitium for bicarbonate ions in the filtrate; it is also responsible for secreting organic acids, such as creatinine and other bases, into the filtrate.

Fluid in the filtrate entering the proximal convoluted tubule is reabsorbed into the peritubular capillaries. This is driven by sodium transport from the lumen into the blood by the Na^+/K^+ ATPase in the basolateral membrane of the epithelial cells. Sodium reabsorption is primarily driven by this P-type ATPase. This is the most important transport mechanism in the PCT.

57. Which of the following processes was discovered by Lederberg and Tatum (1946)?
(A) Transduction (B) Transformation (C) Asexual reproduction (D) Conjugation

Ans : (D)

58. The component of bacteria that retains the crystal violet stain during Gram-staining is
(A) O-antigen (B) Lipopolysaccharide (C) Peptidoglycan (D) Cytoplasmic membrane

Ans : (C)

Solution : During Gram staining alcohol treatment is done. Alcohol solubilises lipid but not peptidoglycan. In Gram positive bacteria lipid percentage is less and peptidoglycan percentage is more. So, peptidoglycan which does not get solubilised retains the stain.

59. Which of the following bacteria is observed as chain-like formation?
(A) *Escherichia coli* (B) *Bacillus subtilis*
(C) *Streptococcus pyogenes* (D) *Micrococcus flavus*

Ans : (C)

60. During gene cloning, the enzyme used to join the insert DNA with the plasmid vector is
(A) DNA ligase (B) Restriction endonuclease (C) Alkaline phosphatase (D) Exonuclease

Ans : (A)

Solution : DNA ligase is also called as molecular glue because it is used to join insert DNA with the plasmid vector.

CATEGORY - II

Q.61 to Q.75 carry two marks each, for which only one option is correct. Any wrong answer will lead to deduction of 2/3 mark

61. The partial floral formula of a flower is $K(5)C5A(\infty)G(5)$. Which of the following set of information is conveyed here?
(A) Gamosepalous, polypetalous, syncarpous and superior ovary
(B) Polysepalous, polypetalous, syncarpous and inferior ovary
(C) Gamosepalous, gamopetalous, polycarpous and superior ovary
(D) Gamosepalous, polypetalous, syncarpous and inferior ovary

Ans : (A)

62. In a plant species, flower colour yellow is dominant over white, and fruit shape round is dominant over elongated. Crossing was performed between two pure lines-one having yellow-flower and round-fruit, and another with white flower and elongated-fruit. About 20 plants survived in F1 progeny. Plants of F1 were allowed to self-fertilize, and about 960 plants survived in F2. If the traits follow Mendelian inheritance, the number of plants would have yellow-flower and round-fruit in F1 and F2 are respectively
 (A) 20,960 (B) 20,540 (C) 10,180 (D) 10,60

Ans : (B)

63. Match the items in column I with those in column II, and choose the CORRECT answer.

Column I	Column II
P. Control of weeds	i. Gibberellin
Q. Induction of germination	ii. Cytokinin
R. Ripening of fruit	iii. 2, 4-D
S. Delaying of senescence	iv. Ethylene

- (A) P-ii, Q-iv, R-iii, S-i (B) P-iii, Q-i, R-iv, S-ii (C) P-i, Q-ii, R-iv, S-iii (D) P-ii, Q-iii, R-i, S-iv

Ans : (B)

64. Out of 38 molecules of ATP produced upon aerobic respiration of glucose, the break up in ATP production in glycolysis (P), pyruvate to acetyl-CoA formation (Q) and Krebs cycle (R) is as follows:
 (A) P = 2, Q = 6, R = 30 (B) P = 8, Q = 6, R = 24
 (C) P = 8, Q = 10, R = 20 (D) P = 2, Q = 12, R = 24

Ans : (B)

65. The correct sequence of organelles in which glycolate and glyoxylate are produced sequentially in photorespiration, is
 (A) Chloroplast and mitochondria (B) Chloroplast and peroxisome
 (C) Peroxisome and mitochondria (D) Peroxisome and chloroplast

Ans : (B)

66. Cells die at the time of release of secretory materials in
 (A) Holocrine gland (B) Apocrine gland (C) Merocrine gland (D) Mixed gland

Ans : (A)

Solution: Cell die at the time of release of secretory materials in holocrine gland, *e.g.*, Sebaceous gland

Holocrine is a term used to classify the mode of secretion in exocrine glands in the study of histology. Holocrine secretions are produced in the cytoplasm of the cell and released by the rupture of the plasma membrane, which destroys the cell and results in the secretion of the product into the lumen.

Holocrine secretion is the most damaging type of secretion, with merocrine secretion being the least damaging and apocrine secretion falling in between.

Examples of holocrine glands include the sebaceous glands of the skin and the meibomian glands of the eyelid. The sebaceous gland is an example of a holocrine gland because its product of secretion (sebum) is released with remnants of dead cells.

67. X-ray is needed for
(A) Ultrasonography (B) CT scanning (C) MRI (D) NMR

Ans : (B)

Solution: A low dose of X-ray is used in CT scan.

68. Which of the following statements is wrong?
(A) Test tube baby grows inside test tube
(B) Test tube baby grows within mother's womb
(C) Test tube baby grows within surrogate mother's womb
(D) Test tube baby grows following uterine fertilization

Ans : (D)

69. The correct sequence of embryonic development is
(A) Blastula - Morula - Zygote - Gastrula - Embryo
(B) Zygote - Blastula - Morula - Gastrula - Embryo
(C) Zygote - Morula - Blastula - Gastrula - Embryo
(D) Gastrula - Morula - Zygote - Blastula - Embryo

Ans : (C)

Solution: Sequence of embryonic development is Zygote → Morula → Blastula → Gastrula → Embryo

70. The time interval of appearance of fever in the malarial patients depends on the types of malaria. The research evidences suggest that such time intervals are – (1) 36 to 48 hours, (2) 48 hours, and (3) 72 hours. If any such patient experiences fever at an interval of 48 hours, then the said patient suffers from
- (A) Only benign tertian malaria
 - (B) Quarantan malaria or mild tertian malaria
 - (C) Malignant tertian malaria or Benign tertian malaria
 - (D) Mild tertian malaria or Benign tertian malaria

Ans : (D)

Solution: Patient experiences fever at an interval of 48 hours in mild tertian malaria caused by *P. ovale* and benign tertian malaria by *P. vivax*

71. The structure of *E. coli* chromosomal DNA is
- (A) Double stranded, right handed and circular
 - (B) Single stranded, right handed and circular
 - (C) Double stranded, left handed and linear
 - (D) Double stranded, left handed and circular

Ans : (A)

72. Absorption of vitamin B12 in human requires “P” glycoprotein secreted form “Q”. The correct choice of P and Q are
- (A) P = Extrinsic factor and Q = Stomach
 - (B) P = Intrinsic factor and Q = Stomach
 - (C) P = Intrinsic factor and Q = Small intestine
 - (D) P = Exopolysaccharide and Q = Small intestine

Ans : (B)

Solution: Castle’s intrinsic factor is secreted by oxyntic or parietal cell of stomach. It helps in vitamin B12 absorption.

73. What type of cartilaginous tissue is found in the inter-vertebral discs?
- (A) Costal cartilage
 - (B) Hyaline cartilage
 - (C) White fibrous cartilage
 - (D) Yellow elastic cartilage

Ans : (C)

Solution: White fibrous cartilage tissue is found in the inter-vertebral discs .

74. If spermatogenesis proceeds too rapidly, inhibin is released. Inhibin reduces the secretion of
- (A) Lutinizing Hormone (LH)
 - (B) Follicle Stimulating Hormone (FSH)
 - (C) Testosterone
 - (D) Interstitial Cell Stimulating Hormone (ICSH)

Ans : (B)

Solution: Inhibin, hormone secreted by the granulosa cells in the ovaries of women that acts primarily to inhibit the secretion of follicle-stimulating hormone (FSH) by the anterior pituitary gland.

75. Which of the following statements are **TRUE** for “Motor cortex”?
- | | |
|--|--|
| (i) It is located in the frontal lobe of cerebral cortex | (ii) It contains pyramidal cells |
| (iii) It is responsible for all visual functions | (iv) It is essential for our thought processes |
| (v) It stimulates wakefulness | (vi) It regulates voluntary muscular movements |
- (A) (i), (ii), (iii) and (iv) (B) (ii), (iii), (iv) and (v)
(C) (ii), (iv), (v) and (vi) (D) (i), (ii), (iv) and (vi)

Ans : (D)

Solution: Motor cortex located in the frontal lobe of cerebral cortex contains pyramidal cells, regulates voluntary muscular movements and is essential for our thought processes.

CATEGORY - III

Q.76 to Q.80 carry two marks each, for which one or more than one options may be correct. Marking of correct options will lead to a maximum mark of two on pro rata basis. There will be no negative marking for these questions. However, any marking of wrong option will lead to award of zero mark against the respective question – irrespective of the number of correct options marked.

76. Identify the correct statement (s) in relation to C4 photosynthesis
- (A) Kranz anatomy is an essential feature for C4 plants
(B) C4 plants have higher water use efficiency than C3 plants
(C) Photorespiration can be minimized when C4 pathway is in operation
(D) Conversion of oxaloacetate to malate occurs in the bundle sheath cells

Ans : (A,B,C)

77. Genetically improved crop varieties can be developed in laboratory by
- | | |
|-----------------------------|---------------------------|
| (A) Somatic hybridization | (B) Transgenic technology |
| (C) Cell suspension culture | (D) Somaclonal variation |

Ans : (A,B,D)

Solution: Somatic hybridization, transgenic technology and somaclonal variation are the methods by which genetically improved crop varieties can be developed in laboratory.

78. Sand flies play significant role in spreading Kala-azar because they
- (A) Suck blood only from the patients suffering from kala-azar
 - (B) Convert amastigote into promastigote
 - (C) Engulf amastigote at the time of blood sucking from the infected persons
 - (D) Inject promastigote into the body of non-infected persons at the time of blood sucking

Ans : (B,C,D)

Solution: Sand fly takes a blood meal and injects macrophages infected with amastigotes → Amastigotes transform into promastigote stage in midgut → Divide in midgut and migrate to proboscis → Amastigotes again get transferred into the skin of host during taking blood as meal.

79. Which of the following factor(s) increase blood pressure?
- (A) Increase of cardiac output
 - (B) Constriction of blood vessel
 - (C) Activation of parasympathetic nerve
 - (D) Increase of blood volume

Ans : (A,B,D)

Solution: Blood pressure increases in case of increased cardiac output, constriction of blood vessels, increase in the volume of blood and by activation of sympathetic nerves.

80. Which of the following statement(s) are **TRUE**?
- (A) Antibiotics can kill bacteria but disinfectants do not
 - (B) Disinfectants have better bactericidal efficiency than antibiotics
 - (C) Antibiotics are of microbial origin but disinfectants are chemical compounds
 - (D) Antibiotics can be injected into the patients whereas disinfectants are not

Ans : (B,C,D)

Aolution: Disinfectants are chemical compounds having better bactericidal efficiency than antibiotics which are of microbial origin. Antibiotics can be injected into the patients whereas disinfectants are not.

END