

NEET 2017 BIOLOGY

1. A decrease in blood pressure/volume will not cause the release of
- (1) atrial natriuretic factor. (2) aldosterone.
(3) ADH. (4) renin.

1. ANF is atrial natriuretic factor. ANF is a hormone produced by the walls of the atria of the heart in response to an increase in blood volume and pressure. It increases sodium excretion and decreases blood pressure.

Answer (1)

2. Which of the following are not polymeric?
- (1) Proteins (2) Polysaccharides
(3) Lipids (4) Nucleic acids

2. Small organic molecules can combine into very large molecules that are called macromolecules or biomacromolecules. The acid insoluble portion of the cellular pool consists of the biomacromolecules from cytoplasm and organelles. These include proteins, nucleic acids, lipids and polysaccharides. Except for lipids, the other biomacromolecules are polymeric and have molecular weight in the range of 10,000 Da and above.

Answer (3)

3. A baby boy aged two years is admitted to play school and passes through a dental check-up. The dentist observed that the boy had twenty teeth. Which teeth were absent?
- (1) Canines (2) Pre-molars
(3) Molars (4) Incisors

3. Deciduous teeth begin to erupt at about 6 months of age and one pair appears about each month thereafter until all 20 are present (8 incisors, 4 canines, 0 premolars and 8 molars). They are generally lost in the same sequence between 6 and 12 years of age.

Answer (2)

4. Which of the following statements is correct?
- (1) The descending limb of loop of Henle is impermeable to water.
(2) The ascending limb of loop of Henle is permeable to water.
(3) The descending limb of loop of Henle is permeable to electrolytes.
(4) The ascending limb of loop of Henle is impermeable to water.

4. A little amount of filtered water is reabsorbed in the descending limb of the loop of Henle, little or no water is reabsorbed in the ascending limb because the membranes are virtually impermeable to water.

Answer (4)

5. Adult human RBCs are enucleate. Which of the following statement(s) is/are most appropriate explanation for this feature?
- (a) They do not need to reproduce.
(b) They are somatic cells
(c) They do not metabolize.
(d) All their internal space is available for oxygen transport.

Options:

- (1) Only (a)

- (2) (a), (c) and (d)
- (3) (b) and (c)
- (4) Only (d)

5. RBCs lack nucleus and other organelles and can neither reproduce nor carry extensive metabolic activities. Every 100 mL of blood of a healthy human being contains 12–16 g of hemoglobin. Red blood cells are highly specialized for their oxygen transport function. Because mature RBCs have no nucleus, all their internal space is available for oxygen transport

Answer (2)

6. An important characteristic that Hemichordates share with Chordates is

- (1) ventral tubular nerve cord. (2) pharynx with gill slits.
- (3) pharynx without gill slits. (4) absence of notochord.

6. The hemichordates bear gill slits and hollow nerve chord, which is identifying characteristics of chordates. The pharynx consists of gill slits.

Answer (2)

7. Alexander Von Humbolt described for the first time

- (1) Laws of limiting factor.
- (2) species are relationships.
- (3) population growth equation.
- (4) ecological biodiversity.

7. Species–Area Relationships (SAR) is an important concept in ecology. The SAR links area with species richness. The bigger the area, the more are the number of species found. Alexander von Humboldt observed that there is an increase in species richness with increasing explored area only up to a certain limit.

Answer (2)

8. Identify the wrong statement in context of heartwood

- (1) it is highly durable.
- (2) it conducts water and minerals efficiently.
- (3) it comprises dead elements with highly lignified walls.
- (4) organic compounds are deposited in it.

8. Sapwood is the part of wood in a living tree that contains living cells and reserve materials. It is converted into heartwood due to death of parenchyma and other living cells of the wood followed by removal of reserved substances or their conversion into heartwood substances. The function of conduction of water and minerals from the roots is now performed by outer younger rings of secondary xylem which is the sap wood or alburnum.

Answer (2)

9. Which one of the following statements is correct, with reference to enzymes?

- (1) Holoenzyme = Apoenzyme + Coenzyme
- (2) Coenzyme = Apoenzyme + Holoenzyme
- (3) Holoenzyme = Coenzyme + Co-factor
- (4) Apoenzyme = Holoenzyme + Coenzyme

9. Holoenzyme is a catalytically active enzyme-cofactor complex. The enzymatically inactive protein resulting from the removal of a holoenzyme's cofactor is referred to as an apoenzyme. The coenzymes also act as cofactors in different enzyme-catalyzed reactions, thus they are reaction specific.

Apoenzyme (inactive) + Coenzyme (Cofactor) = Holoenzyme (active)

Answer (1)

10. Root hairs develop from the region of

- (1) elongation. (2) root cap.
(3) meristematic activity. (4) maturation.

10. The cells of region of elongation gradually differentiate and become functionally mature and form the region of maturation. The cells mature and differentiate to form primary tissue of root-cortex, endodermis, pericycle, vascular bundles, etc. Most of the water absorption occurs in this region. The epidermal cells give rise to lateral tubular outgrowth known as root hairs which help in increasing surface area for absorption of water. Since numerous root hairs are present in this region, it is also known as root hair region.

Answer (4)

11. Among the following characters, which one was not considered by Mendel in his experiments on pea?

- (1) Trichomes-glandular or non-glandular.
(2) Seed-green or yellow.
(3) Pod-inflated or constricted.
(4) Stem-tall or dwarf.

11. Mendel choose 14 pea plants to focus on seven clearly definable characters, including plant height and flower color, each of which occurred in two allelomorphic traits.

<i>S. No</i>	<i>Character</i>	<i>Dominant Trait</i>	<i>Recessive Trait</i>
1	Plant height	Tall	Dwarf
2	Flower color	Purple	White
3	Flower/pod position	Axial	Terminal
4	Pod shape	Inflated	Constricted
5	Pod color	Green	Yellow
6	Seed shape	Round	Wrinkled
7	Seed color	Yellow	Green

Answer (4)

12. Which of the following facilitates opening of stomatal aperture?

- (1) Decrease in turgidity of guard cells.
(2) Radial orientation of cellulose microfibrils in the cell wall of guard cells.
(3) Longitudinal orientation of cellulose microfibrils in the cell wall of guard cells.
(4) Contraction of outer wall of guard cells.

12. The orientation of microfibrils in the guard cells also plays an important role in opening and closing of stomata. The microfibrils are arranged in a radial fashion and fan out from the central area of the ventral wall.

Answer (2)

13. The association of histone H1 with a nucleosome indicates

- (1) DNA replication is occurring.
(2) The DNA is condensed into a chromatin fibre.

(3) The DNA double helix is exposed.

(4) Transcription is occurring.

13. The core of nucleosome consists of an octamer (8 molecules; two molecules each of histones H2a, H2b, H3, and H4) of histones and 146 bp DNA. Around 200 bp of DNA helix are associated with a nucleosome. They are all stabilized by the binding of one molecule of histone H1 to the outside of the structure. The nucleosome further coils to form solenoid having 6 nucleosomes per turn. Actually, the nucleosomal organization has approximately 10 nm thickness, which gets further condensed and coiled to produce a solenoid of 30 nm. This solenoid structure undergoes further coiling to produce a chromatin fiber of 30–80 nm and then a chromatid of 700 nm.

Answer (2)

14. DNA fragments are

(1) negatively charged.

(2) neutral.

(3) either positively or negatively charged depending on their size.

(4) positively charged.

14. Electrophoresis is a technique that uses differences in electrical charges to separate the molecules in a mixture. Since DNA molecules have negative charges, they migrate towards the positive pole when placed in an electric field.

Answer (1)

15. The process of separation and purification of expressed protein before marketing is called

(1) downstream processing.

(2) bioprocessing.

(3) postproduction processing.

(4) upstream processing.

15. Purification and downstream processing technologies are used to separate and purify the specific protein or organic compound. Downstream processing (DSP) refers to the recovery and purification of products that are produced by fermentation or other industrial processes.

Answer (1)

16. An example of colonial alga is

(1) *Volvox*

(2) *Ulothrix*

(3) *Spirogyra*

(4) *Chlorella*

16. In colonial algae, the cells are present in group and form colonies. The colonies can be motile (e.g., *Volvox*) due to the presence of flagellum or non-motile due to its absence (e.g., *Hydrodictyon*).

Answer (1)

17. Capacitation occurs in

(1) epididymis.

(2) vas deferens.

(3) female reproductive tract.

(4) rete testis.

17. Capacitation is the change which occurs in sperm before fertilization, by destabilizing the acrosomal sperm head. This change occurs in mammals only in the reproductive tract of female.

Answer (3)

18. Select the mismatch:

(1) Rhodospirillum - Mycorrhiza

(2) Anabaena - Nitrogen fixer

(3) Rhizobium - Alfalfa

(4) Frankia - Alnus

18. The free-living nitrogen-fixing bacteria are widespread; however, they grow slowly as large amount of their respiratory energy is required to fix dinitrogen. Thus, except for the photosynthetic species, they confine to habitats rich in organic carbon.

Although some species are aerobic (e.g., *Azotobacter*, *Beijerinckia*), most fix dinitrogen under anaerobic conditions or in the presence of low oxygen. These include both non-photosynthetic genera (*Clostridium*, *Bacillus*, *Klebsiella*) and photosynthetic genera (*Chromatium*, *Rhodospirillum*) of bacteria.

Answer (1)

19. Homozygous purelines in cattle can be obtained by

- (1) mating of unrelated individuals of same breed.
- (2) mating of individuals of different breed.
- (3) mating of individuals of different species.
- (4) mating of related individuals of same breed.

19. Inbreeding refers to the mating between the closely related individuals for 4-6 generations within the same breed. If the parent stock contains desirable characteristics, then these are inherited by the offspring. For example, a cow that produces large amount and good quality of milk can be mated with a bull which can produce superior offspring as compared to others in the breed. In animals, inbreeding is used to develop pure lines as it increases homozygosity.

Answer (4)

20. The DNA fragments separated on an agarose gel can be visualized after staining with

- (1) acetocarmine.
- (2) aniline blue.
- (3) ethidium bromide.
- (4) bromophenol blue.

20. At the end of a PCR, a sample of the reaction mixture is usually analyzed by agarose gel electrophoresis. The DNA produced should be sufficient for the amplified fragment to be visible as a discrete band after staining with EtBr. Ethidium bromide binds to DNA molecules by intercalating between adjacent base pairs, causing partial unwinding of the DNA double helix. Bands showing the positions of the different sizes of DNA fragment are clearly visible under ultraviolet irradiation after EtBr staining, as long as sufficient DNA is present.

Answer (3)

21. Double fertilization is exhibited by

- (1) Algae.
- (2) Fungi.
- (3) Angiosperms.
- (4) Gymnosperms.

21. Double fertilization is a process unique to angiosperms. They are able to undergo double fertilization where the fusion takes place twice, one between the egg cell and a male gamete and the other between the polar nuclei and the second male gamete. This accounts for their widespread growth

Answer (3)

22. The water potential of pure water is

- (1) less than zero.
- (2) more than zero but less than one.
- (3) more than one.
- (4) zero.

22. The water potential of pure water at standard temperature and atmospheric pressure is taken to be zero.

Answer (4)

23. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation
- (1) X = 12, Y = 5 True ribs are attached dorsally to vertebral column and sternum on the two ends.
- (2) X = 24, Y = 7 True ribs are dorsally attached to vertebral column but are free on ventral side.
- (3) X = 24, Y = 12 True ribs are dorsally attached to vertebral column but are free on ventral side.
- (4) X = 12, Y = 7 True ribs are attached dorsally to vertebral column and ventrally to the sternum.

23. Twelve pairs of ribs, numbered 1–12 from superior to inferior, give structural support to the sides of the thoracic cavity. The first seven pairs of ribs that have costal cartilages and attach directly to the sternum are called true (vertebrosternal) ribs. They attach posteriorly to the thoracic vertebrae and ventrally to the sternum by a hyaline cartilage.

Answer (4)

24. DNA replication in bacteria occurs
- (1) within nucleolus. (2) prior to fission.
- (3) just before transcription. (4) during S phase.

24. In binary fission, a cell duplicates its components and divides into two cells. Asexual reproduction in bacteria is by binary fission. Before binary fission, there is replication of genetic material. After this, the cell divides. In continuously dividing cells, DNA synthesis is continuous and the bacterial chromosome is replicated shortly before the cell divides. The chromosome is attached to the cell membrane, which grows and separates the replicated chromosomes. Replication of the chromosome is completed before cell division, when the cell may temporarily contain two or more nucleoids.

Answer (2)

25. Which cells of 'Crypts of Lieberkuhn' secrete antibacterially lysozyme?
- (1) Paneth cells (2) Zymogen cells
- (3) Kupffer cells (4) Argentaffin cells

25. Paneth cells are present in crypts of Lieberkuhn of duodenum. They secrete lysozyme, a bactericidal enzyme and are capable of phagocytosis. These cells may also have a role in regulating the microbial population in the small intestine.

Answer (1)

26. The hepatic portal vein drains blood to liver from
- (1) Stomach. (2) Kidneys.
- (3) Intestine. (4) Heart.

26. The hepatic portal vein receives blood from capillaries of gastrointestinal organs (small intestine and portions of large intestine) and the spleen and delivers it to the sinusoids (blood vessels lined with discontinuous endothelium having phagocytes, also found in spleen and bone marrow) of the liver.

Answer (3)

27. In case of a couple where the male is having a very low sperm count, which technique will be suitable for fertilization?
- (1) Gamete intracytoplasmic fallopian transfer

- (2) Artificial insemination
- (3) Intracytoplasmic sperm injection
- (4) Intrauterine transfer

27. Intra cytoplasmic sperm injection (ICSI) technique is used to treat male infertility (i.e. low sperm count, low motility of sperm or intracellular sperm infection) and in older couples where IVF attempts have been unsuccessful. In this technique, the sperms are obtained from ejaculation and a single sperm is injected into a mature egg with the help of a microneedle. The fertilization rate through ICSI is 60–70%.

Answer (3)

- 28.** What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis?
- (1) The smaller the fragment size, the farther it moves.
 - (2) Positively charged fragments move to farther end.
 - (3) Negatively charged fragments do not move.
 - (4) The larger the fragment size, the farther it moves.

28. The gel is made up of agarose (from sea weed) or polyacrylamide or a mixture of two. It has a complex network of pores provides sieving effect and allows the DNA molecules to travel and reach the positive electrode. The smaller the DNA molecule, faster is the migration. So, the DNA band that is the farthest from the well where it was loaded, is the smallest in size.

Answer (1)

- 29.** The function of copper ion in copper releasing IUD's is
- (1) they inhibit gametogenesis.
 - (2) they make uterus unsuitable for implantation.
 - (3) they inhibit ovulation.
 - (4) they suppress sperm motility and fertilizing capacity of sperms.

29. Intra uterine devices (IUD) is a small object made of plastic, copper, or stainless steel that is inserted into the cavity of the uterus through vagina to prevent sperm from entering the fallopian tubes and enhance phagocytosis of the sperms. The copper ions reduce sperm motility and fertilizing capacity.

Answer (4)

- 30.** Spliceosomes are not found in cells of
- | | |
|---------------|--------------|
| (1) Fungi. | (2) Animals. |
| (3) Bacteria. | (4) Plants. |

30. The splicing mechanism must be highly precise and accurate. The exon sequences should be joined accurately so that the codons are read correctly during translation. In tRNA precursors, introns are removed by a splicing endonuclease and ligase. The rRNA precursors are spliced out autocatalytically without any involvement of catalytic proteins. In nuclear pre-mRNAs, introns are excised on complex ribonucleoprotein structures called spliceosomes. It occurs in the eukaryotes (fungi, animals and plants) and absent in prokaryotes such as bacteria.

Answer (3)

- 31.** Which of the following cell organelles is responsible for extracting energy from carbohydrates to form ATP?
- | | |
|-------------------|-----------------|
| (1) Ribosome | (2) Chloroplast |
| (3) Mitochondrion | (4) Lysosome |

31. Aerobic respiration takes place in mitochondria. Pyruvate produced during glycolysis is transported from cytoplasm into mitochondria. Carbohydrates are broken down into simple sugars such as glucose or into sugars that are changed to glucose. Glucose is metabolized by glycolysis, the Krebs' cycle and the electron transport chain. During electron transfer, protons are removed from the mitochondrion. This produces a proton gradient across the mitochondrial membrane. The free energy stored as a result of oxidation-reduction in this electrochemical gradient helps in the synthesis of ATP from ADP and Pi, hence it is termed oxidative phosphorylation.

Answer (3)

32. The pivot joint between atlas and axis is a type of
- | | |
|--------------------------|---------------------|
| (1) cartilaginous joint. | (2) synovial joint. |
| (3) saddle joint. | (4) fibrous joint. |

32. Joint between atlas and axis is pivot joint which is an example of synovial joint characterized by the presence of a fluid filled synovial cavity between the articulating surfaces of the two bones.

Answer (2)

33. GnRH, a hypothalamic hormone, needed in reproduction, acts on
- | |
|-----------------------------------------------------------------------------|
| (1) anterior pituitary gland and stimulates secretion of LH and FSH. |
| (2) posterior pituitary gland and stimulates secretion of oxytocin and FSH. |
| (3) posterior pituitary gland and stimulates secretion of LH and relaxin. |
| (4) anterior pituitary gland and stimulates secretion of LH and oxytocin. |

33. Gonadotropin-releasing hormone (GnRH) secreted by the hypothalamus controls the ovarian and menstrual cycles. GnRH stimulates the release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) from the anterior pituitary.

Answer (1)

34. Which of the following represents order of Horse?
- | | |
|--------------------|--------------|
| (1) Perissodactyla | (2) Caballus |
| (3) Ferus | (4) Equidae |

34. Order Perissodactyla includes odd-toed ungulates such as rhinoceros, zebra, etc. Examples: *Equus caballus* (Horse), *Equus zebra* (Zebra), *Equus assinis* (Ass), *Rhinoceros*, etc.

Answer (1)

35. Phosphoenol pyruvate (PEP) is the primary CO₂ acceptor in
- | | |
|-----------------------------------------------|----------------------------|
| (1) C ₄ plants. | (2) C ₂ plants. |
| (3) C ₃ and C ₄ plants. | (4) C ₃ plants. |

35. Biochemical and anatomical adaptations of C₄ plants suggest that thick impervious walls of the bundle sheath cells do not allow CO₂ to escape from the cell. Even if it does, it is trapped by phosphoenol pyruvate carboxylase (the initial fixation PEPcase fixation of PEP) present in the adjacent mesophyll cells before it can escape from the leaf. Thus, C₄ plants, apart from absorbing CO₂, also play a role in trapping and recirculating it.

Answer (1)

36. Which ecosystem has the maximum biomass?
- | | |
|-------------------------|----------------------|
| (1) Grassland ecosystem | (2) Pond ecosystem |
| (3) Lake ecosystem | (4) Forest ecosystem |

36. In a forest ecosystem, single large-sized tree is attacked by numerous minute plant-eating insects preyed upon by fewer spiders and carnivorous insects which are further preyed upon by a lesser number of small sized birds which are finally preyed upon by only a few large sized birds of prey, the pyramid

of number is spindle-shaped. The total amount of organic matter on the Earth or in any ecosystem or area is called its biomass. Higher biomass is present in forest ecosystem.

Answer (4)

37. A disease caused by an autosomal primary non-disjunction is

- (1) Klinefelter's syndrome.
- (2) Turner's syndrome.
- (3) Sickle cell anemia.
- (4) Down's syndrome.

37. During meiosis I, if a homologous pair of chromosomes does not separate (primary non-disjunction), both the chromosomes appear in one daughter cell, while the other receive one chromosome less than normal or no chromosomes at all. A trisomy is a condition in which an individual has inherited an extra chromosome, resulting in three copies of a particular chromosome instead of the usual two copies. Therefore, the individual would have 47 instead of 46 chromosomes. The presence of an extra copy of chromosome 21 leads to Down syndrome. The two chromosomes of 21 do not separate out and pass into a single egg during oogenesis. Thus, the egg now has 24 chromosomes instead of 23, and the progeny has 47 chromosomes (45 + XY in male, 45 + XX in female), instead of 46 chromosomes (44 + XX or XY). It does not involve any sex-linked chromosome it means it is an autosomal disease.

Answer (4)

38. The vascular cambium normally gives rise to

- (1) primary phloem.
- (2) secondary xylem.
- (3) periderm.
- (4) phelloderm.

38. Lateral meristems, situated along the side of stems and roots, cause secondary growth in plants and produce vascular cambium producing secondary xylem and phloem and cork-cambium producing cork. The cork cambium (phellogen) is a lateral meristem which produces dead cells or cork (phellem) towards outside and living cells of secondary cortex (phelloderm) towards inner side.

Answer (2)

39. Which of the following is correctly matched for the product produced by them?

- (1) *Methanobacterium*: Lactic acid
- (2) *Penicillium notatum*: Acetic acid
- (3) *Sacchromyces cerevisiae*: Ethanol
- (4) *Acetobacter aceti*: Antibiotics

39. Ethanol (ethyl alcohol) is an alcoholic beverage and also considered as psychoactive drug. The names of alcoholic beverages are mainly determined based upon the substrate (grains, fruit juice, vegetables and other ingredients) used. The yeasts used in brewing for preparing juices or alcoholic drinks are called Brewer's yeast. For example, yeast *Saccharomyces cerevisiae* is used in the fermentation of juices or cereals.

Answer (3)

40. Thalassaemia and sickle cell anemia are caused due to a problem in globin molecule synthesis. Select the correct statement.

- (1) Both are due to a quantitative defect in globin chain synthesis.

- (2) Thalassemia is due to less synthesis of globin molecules.
- (3) Sickle cell anemia is due to a quantitative problem of globin molecules.
- (4) Both are due to qualitative defect in globin chain synthesis.

40. Thalassemia is an autosomal recessive form of anemia which occurs due to mutation or deletion of the genes controlling the synthesis of globin chains of hemoglobin. This incomplete synthesis of hemoglobin makes the RBCs small (microcytic), pale (hypochromic) and short-lived. Since it is an autosomal recessive disease, the mutant allele is carried on one of the autosomes, so the carrier can be any one of the two parents. It means thalassemia is a quantitative disorder. Whereas the RBCs of a person with sickle-cell anemia contains Hb^s, an abnormal kind of hemoglobin. When Hb^s, gives up oxygen to the interstitial fluid, it forms long, stiff, rod-like structures that bend the erythrocyte into a sickle shape. In the case of Hb^s, the substitution of valine for glutamic acid at the sixth position in the β chain allows a new bond to form, which changes the conformation of the protein and leads to aggregation of hemoglobin molecules and sickle cell anemia is qualitative disease.

Answer (2)

- 41.** Flowers which have single ovule in the ovary and are packed into inflorescence are usually pollinated by
- (1) Bee. (2) Wind.
 - (3) Bat. (4) Water.

41. Transfer of pollen from anther to stigma by air is known as wind pollination or anemophily. Flowers have a single ovule in each ovary. Flowers are produced above the foliage, with numerous flowers packed into inflorescence. Wind-pollination is generally observed in trees of cool temperate regions and in grasses.

Answer (2)

- 42.** Receptor sites for neurotransmitters are present on
- (1) pre-synaptic membrane.
 - (2) tips of axons.
 - (3) post-synaptic membrane.
 - (4) membranes of synaptic vesicles.

42. The pre-synaptic neuron converts an electrical signal (nerve impulse) into a chemical signal (released neurotransmitter). The post-synaptic neuron receives the chemical signal and in turn generates an electrical signal (post-synaptic potential). The neurotransmitter molecules diffuse across the synaptic cleft and bind to neurotransmitter receptors in the post-synaptic neuron's plasma membrane.

Answer (3)

- 43.** During DNA replication, Okazaki fragments are used to elongate
- (1) the lagging strand towards replication fork.
 - (2) the leading strand away from replication fork.
 - (3) the lagging strand away from the replication fork.
 - (4) the leading strand towards replication fork.

43. Before fragment synthesis, a suitable stretch of template must be exposed. This is achieved by the movement of the replication fork. The strand that is synthesized discontinuously is called the lagging strand (template having 5' → 3' polarity) because initiation of each fragment must wait for the parental strands to separate or get away and expose additional template. Reiji Okazaki of Japan discovered that one strand is synthesized as fragments or small segments. These segments later came to be known as Okazaki fragments.

Answer (3)

44. Which of the following options best represents the enzyme composition of pancreatic juice?

- (1) Amylase, pepsin, trypsinogen, maltase.
- (2) Peptidase, amylase, pepsin, rennin.
- (3) Lipase, amylase, trypsinogen, procarboxypeptidase.
- (4) Amylase, peptidase, trypsinogen, rennin.

44. Pancreatic juice contains following enzymes:

Enzyme	Source
Pancreatic amylase	Pancreatic acinar cells
Trypsin (activated from trypsinogen by enterokinase)	Pancreatic acinar cells
Carboxypeptidase (activated from procarboxypeptidase by trypsin)	Pancreatic acinar cells
Pancreatic lipase	Pancreatic acinar cells

Answer (3)

45. Anaphase promoting complex (APC) is protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, which of the following is expected to occur?

- (1) Chromosomes will be fragmented.
- (2) Chromosomes will not segregate.
- (3) Recombination of chromosome arms will occur.
- (4) Chromosomes will not condense.

45. The entry of a cell into M phase is initiated by a protein called maturation-promoting factor (MPF). One of these checkpoints operates at the transition between metaphase and anaphase. The spindle assembly checkpoint (SAC) is best observed when a chromosome fails to become aligned properly at the metaphase plate. When this happens, the checkpoint mechanism delays the onset of anaphase until the misplaced chromosome has assumed its proper position along the spindle equator. If a cell were not able to postpone chromosome segregation, it would greatly elevate the risk of the daughter cells receiving an abnormal number of chromosomes (aneuploidy). This condition greatly increases risk of developing cancer.

Answer (2)

46. The genotypes of a husband and wife are $I^A I^B$ and $I^A i$. Among the blood type of their children, how many different genotypes and phenotypes are possible?

- (1) 3 genotypes; 4 phenotypes
- (2) 4 genotypes; 3 phenotypes
- (3) 4 genotypes; 4 phenotypes
- (4) 3 genotypes; 3 phenotypes

46. $I^A I^B \times I^A i$

	I^A	I^B
I^A	$I^A I^A$ A	$I^A I^B$ AB
i	$I^A i$	$I^B i$

	A	B
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A, B, AB = 3 phenotypes, $I^A I^B$, $I^A I^A$, $I^A i$, $I^B i$ = 4 genotypes.

Answer (2)

47. Viroids differ from viruses in having
- (1) DNA molecules without protein coat.
 - (2) RNA molecules with protein coat.
 - (3) RNA molecules without protein coat.
 - (4) DNA molecules with protein coat.

47. Viroid RNA does not produce proteins, unlike viruses which do. It is a new type of infectious agent that had molecules of RNA without capsids or envelopes in the nuclei of diseased plant cells.

Answer (2)

48. Mycorrhizae are the example of
- (1) amensalism.
 - (2) antibiosis.
 - (3) mutualism.
 - (4) fungistasis.

48. Mutualism is a relationship in which two species live together in close association, both benefiting from the relationship, which can be facultative (when species can live without their mutualistic partner) and obligate (both the species cannot live independently under natural conditions). The mutually beneficial association of fungi with roots of higher plants is called mycorrhiza.

Answer (3)

49. The morphological nature of the edible part of coconut is
- (1) cotyledon.
 - (2) endosperm.
 - (3) pericarp.
 - (4) perisperm.

49. Endosperm in coconut (inner to endocarp) are edible. Endosperm is the tissue produced inside the seeds of flowering plants around the time of fertilization.

Answer (2)

50. Myelin sheath is produced by
- (1) astrocytes and Schwann cells.
 - (2) oligodendrocytes and osteoclasts.
 - (3) osteodasts and astrocytes.
 - (4) Schwann Cells and oligodendrocytes.

50. Myelin sheaths are produced by two types of neuroglia – Schwann cells (in the PNS) and oligodendrocytes (in the CNS).

Answer (4)

51. Match the following sexually transmitted diseases (Column – I) with their causative agent (Column – II) and select the correct option.

Column – I	Column – II
(a) Gonorrhoea	(i) HIV
(b) Syphilis	(ii) <i>Neisseria</i>

(c) Genital Warts

(d) AIDS

(iii) *Treponema*

(iv) Human Papilloma – Virus

Options:

- | | (a) | (b) | (c) | (d) |
|-----|-------|-------|-------|------|
| (1) | (iii) | (iv) | (i) | (ii) |
| (2) | (iv) | (ii) | (iii) | (i) |
| (3) | (iv) | (iii) | (ii) | (i) |
| (4) | (ii) | (iii) | (iv) | (i) |

51. Gonorrhoea (flow of seed) is caused by the bacterium *Neisseria gonorrhoeae*. Syphilis is caused by *Treponema palladium*. Also known as condylomas, genital warts are caused by the human papillomavirus (HPV).

AIDS is a secondary immunodeficiency condition in which a person experiences infection due to the progressive destruction of immune system cells by the human immunodeficiency virus (HIV). AIDS represents the end stage of infection by HIV.

Answer (4)

52. Which among these is the correct combination of aquatic mammals?

- (1) Dolphins, Seals, *Trygon*.
- (2) Whales, Dolphins, Seals.
- (3) *Trygon*, Whales, Seals.
- (4) Seals, Dolphins, Sharks.

52. The lungs are organs by which most reptiles, amphibians, aquatic mammals, such as whales, seals and dolphins, birds and large land-dwelling animals respire (with the exception of the insects, spiders, roundworms and earthworms).

Answer (2)

53. Coconut fruit is a

- (1) Berry.
- (2) Nut.
- (3) Capsule.
- (4) Drupe.

53. Drupe is one-seeded fruit formed from monocarpellary superior ovaries. Its pericarp is divided into thin epicarp, fleshy mesocarp and stony endocarp. Because of its stony endocarp, it is also known as stone fruit. For example, coconut, mango, almond, peach, etc.

Answer (4)

54. A dioecious flowering plant prevents both

- (1) autogamy and geitonogamy.
- (2) geitonogamy and xenogamy.
- (3) cleistogamy and xenogamy.
- (4) autogamy and xenogamy.

54. If male and female flowers are borne on different plants, it is known as dioecious (e.g., *Vallisneria*, mulberry, papaya). In such cases both autogamy and geitonogamy can be prevented and Xenogamy is favored.

Answer (1)

55. Which of the following are found in extreme saline conditions?

- (1) Eubacteria
- (2) Cyanobacteria
- (3) Mycobacteria
- (4) Archaeobacteria

55. Halophiles are a type of archaeobacteria. The bacteria that live in excessively salty environments such as the Great Salt Lake, the Dead Sea, salt evaporation ponds and the surfaces of salt-preserved foods are called halophiles.

Answer (4)

56. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen?

- (1) *Pseudomonas* (2) *Mycoplasma*
(3) *Nostoc* (4) *Bacillus*

56. Mycoplasmas are the smallest cells with only 0.3 μm length whereas human nerve cells are the longest in the body at 90 cm. Mycoplasma are free-living prokaryotes, and thus do not have cell walls. They can survive without oxygen.

Answer (2)

57. With reference to factors affecting the rate of photosynthesis, which of the following statements is not correct?

- (1) Increasing atmospheric CO_2 concentration up to 0.5% can enhance CO_2 fixation rate.
(2) C_3 plants respond to higher temperatures with enhanced photosynthesis while C_4 plants have much lower temperature optimum.
(3) Tomato is a greenhouse crop which can be grown in CO_2 – enriched atmosphere for higher yield.
(4) Light saturation for CO_2 fixation occurs at 10% of full sunlight.

57. Under high light intensity and high temperature (30–40°C), C_4 plants show 2–3 times higher rate of photosynthesis (measured by CO_2 uptake or O_2 evolution) than C_3 plants. At high temperatures in C_3 plants, the rate of photosynthesis decreases more rapidly as compared to photorespiration. In C_4 plants, because of absence of or suppressed photorespiration and stability of C_4 pathway enzymes, photosynthesis continues to occur at the same pace even if temperature is high.

Answer (2)

58. Life cycle of *Ectocarpus* and *Fucus* respectively are

- (1) Diplontic, Haplodiplontic. (2) Haplodiplontic, Diplontic.
(3) Haplodiplontic, Haplontic. (4) Haplontic, Diplontic.

58. Haplo-diplontic life cycle is seen in bryophytes, pteridophytes and algae such as *Polysiphonia*, *Ectocarpus*, kelps, etc.

Life cycle and reproduction of *Fucus*: These are generally monoecious with external fertilization. The dominant plan body is diploid, and it follows diplontic life cycle.

Answer (2)

59. The region of biosphere reserve which is legally protected and where no human activity is allowed is known as

- (1) buffer zone. (2) transition zone.
(3) restoration zone. (4) core zone.

59. Core zone is an undisturbed or least disturbed and legally protected area of the biosphere reserve.

Answer (4)

60. A gene whose expression helps to identify transformed cell is known as

- (1) vector. (2) plasmid.
(3) structural gene. (4) selectable marker.

60. The transformants and the non-transformants can be distinguished from each other if the recombinant DNA contains genes for antibiotic resistance (which serves as selectable marker). The cells that can grow on the selective medium containing the antibiotic, against which the recombinant DNA carries resistance, are transformed cells. Selectable markers help in identifying and selectively permitting growth of the desired transformants.

Answer (4)

61. Which of the following components provides sticky character to the bacterial cell?

- (1) Nuclear membrane (2) Plasma membrane
(3) Glycocalyx (4) Cell wall

61. Glycocalyx which is a mucilage layer of the cell envelope and consists of non-cellulosic polysaccharides with or without proteins. In other words, the capsules or slime and sticky layers of bacteria are made up of polysaccharide containing substances. These substances are called glycocalyx which acts as a single protective unit by providing sticky character to the bacterial cell.

Answer (3)

62. The final proof for DNA as the genetic material came from the experiments of

- (1) Hershey and Chase. (2) Avery, Mcleod and McCarty.
(3) Hargobind Khorana. (4) Griffith.

62. Thomas Hunt Morgan's experiments in 1910 provided the first clear evidence supporting Sutton's theory. However, it was still not clear about the nature of genetic material. It took a lot of time to conclude that DNA was the genetic material. Alfred Hershey and Martha Chase conducted further experiments to establish that DNA is the genetic material.

Answer (1)

63. Fruit and leaf drop at early stages can be prevented by the application of

- (1) ethylene. (2) auxins.
(3) gibberellic acid. (4) cytokinins.

63. Auxin is a growth promoting hormone that promotes growth by stimulating expansion of cells. The most common naturally occurring auxin is indole-3-acetic acid (IAA). Auxin plays a role in development of abscission layer. However, if the auxin gradient is steep, that is, it is higher in the blade of the leaf than in the petiole, there will be no abscission. Hence, application of auxins such as NAA or 2,4-D prevent their premature falling. This retains the fruit on the tree till it is fully mature and ready for harvesting. However, it promotes abscission in older leaves and fruits.

Answer (2)

64. Which one of the following statements is not valid for aerosols?

- (1) They alter rainfall and monsoon patterns.
(2) They cause increased agricultural productivity.
(3) They have negative impact on agricultural land.
(4) They are harmful to human health.

64. In plants, they interfere with absorption of carbon dioxide and oxygen and transpiration, therefore harmful for agriculture.

Answer (2)

65. Which of the following options gives the correct sequence of events during mitosis?
- (1) condensation → nuclear membrane disassembly → arrangement at equator → centromere division → segregation → telophase.
 - (2) condensation → crossing over → nuclear membrane disassembly → segregation → telophase.
 - (3) condensation → arrangement at equator → centromere division → segregation telophase.
 - (4) condensation → nuclear membrane disassembly → crossing over → segregation → telophase.

65. Each of these stages is characterized by a specific series of events and represents a segment of a continuous process.

- **Prophase:** In early prophase, the cell starts to break down some structures and build others up, setting the stage for division of the chromosomes. The chromosomes start to condense. In prophase, the chromosomes (the sister chromatids) condense by a remarkable process of chromosome compaction or condensation which involves multiprotein complex condensin. The nucleolus (or nucleoli, plural) which are surrounded by nuclear membrane, a part of the nucleus where ribosomes are made, disappears. This is a sign that the nucleus is getting ready to break down. Mitotic spindle formation: As a cell progresses towards mitosis, the microtubules of the cytoskeleton disassemble and reassemble as components of the mitotic spindle. The rapid disassembly of the interphase cytoskeleton occurs by the inactivation of proteins that stabilize microtubules (e.g., microtubule-associated proteins or MAPs) and the activation of proteins that destabilize these polymers.
- **Metaphase:** The dissolution of the nuclear envelope marks the start of metaphase, the second phase of mitosis, during which mitotic spindle assembly is completed and the chromosomes are moved into position at the center of the cell. Ultimately, all of the chromosomes become aligned at the spindle equator—with one chromatid of each chromosome connected by its kinetochore to microtubules from one pole and its sister chromatid connected by its kinetochore to microtubules from the opposite pole.
- **Anaphase:** The splitting of the chromosomes of the metaphase plate takes place in synchrony at the onset of anaphase, and the chromatids (now referred to as chromosomes, because they are no longer attached to their sisters) begin their poleward migration. During this movement towards the poles, the arms of the chromosome trail behind and the centromere is seen at its leading edge. The movement of chromosomes towards opposite poles is very slow relative to other types of cellular movements, proceeding at approximately 1 μm per minute. The slow rate of chromosome movement ensures that the chromosomes segregate accurately and without entanglement.
- **Telophase:** As the chromosomes near their respective poles, they tend to collect in a mass, which marks the beginning of the final stage of mitosis, or telophase. During telophase, daughter cells return to the interphase condition: the mitotic spindle disassembles, the chromosomes become more and more dispersed, the nuclear envelope, Golgi complex and endoplasmic reticulum reform and the nucleolus appears.

Answer (1)

66. In Bougainvillea thorns are the modifications of
- | | |
|------------------------|---------------|
| (1) adventitious root. | (2) stem. |
| (3) leaf. | (4) stipules. |

66. Thorns are formed from axillary bud, thorns are hard and sharp pointed straight or curved hard modified stem. They serve to protect the plant against grazing animals. They reduce transpirational water loss through leaves. They are connected by vascular cylinder with well-developed bark of thick-walled cells. For example, *Bougainvillea*.

Answer (2)

67. If there are 999 bases in an RNA that codes for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered?

- (1) 11 (2) 33
(3) 333 (4) 1

67. If there are 999 bases in RNA that codes for a protein with 333 amino acids by 333 codons. If base at position 901 deleted, then the codon which are unaltered will be 300 for 900 bases but after that sequence of remaining all codon frame shifted (one base right shift). So, number of codon altered will be 33 with 99 bases. So the length of the RNA becomes 998 bases.

Answer (2)

68. Transplantation of tissues/organs fails often due to non-acceptance by the patient's body. Which type of immune-response is responsible for such rejections?

- (1) Cell – mediated immune response
(2) Hormonal immune response
(3) Physiological immune response
(4) Autoimmune response

68. The organs cannot be taken from just anybody because usually, the immune system recognizes the proteins in the transplanted organ as foreign and mounts both cell-mediated and antibody mediated immune responses against them. This phenomenon is known as graft rejection.

Answer (1)

69. Select the correct route for the passage of sperms in male frogs

- (1) Testes → Vasa efferentia → Kidney → Seminal Vesicle → Urinogenital duct → Cloaca.
(2) Testes → Vasa efferentia → Bidder's canal → Ureter → Cloaca.
(3) Testes → Vasa efferentia → Kidney → Bidder's canal → Urinogenital duct → Cloaca.
(4) Testes → Bidder's canal → Kidney → Vasa efferentia → Urinogenital duct → Cloaca.

69. Male reproductive system of frog consists of following:

- **Testes:** A pair of testes is present above the kidneys. They are yellowish and ovoid in shape. They are attached to the kidneys by double fold of peritoneum called mesorchium. Each testis is made up of several seminiferous tubules which are lined by germinal epithelium. These cells produce spermatozoa by spermatogenesis.
- **Vasa efferentia:** About 10–12 vasa efferentia arise from the testes and join the Bidder's canal that is located on the inner border of the kidney.
- **Urino-genital duct:** The longitudinal collecting tubules extend further to form the urino-genital ducts that carry both sperms and urine. Their swollen anterior ends function as seminal vesicles for temporary storage of sperms. The duct opens into the cloaca.
- **Cloaca:** It is a small chamber present in the middle which helps in passing faeces, urine and sperms outside the body through cloacal aperture.

Answer (1)

70. A temporary endocrine gland in the human body is

- (1) corpus cardiacum. (2) corpus luteum.
(3) corpus allatum. (4) pineal gland.

70. Placenta, Graffian follicle and Corpus luteum are temporary endocrine gland.

Answer (2)

71. Attractants and rewards are required for

- (1) entomophily. (2) hydrophily.
(3) cleistogamy. (4) anemophily.

71. Insects are the most common pollinating agents. They carry pollen grains from anther to the stigma of another flower. Bees, butterflies, flies, moths, wasps, etc., pollinate are common insect pollinators. Insect pollination is also known as entomophily and such flowers are called entomophilous -flowers. They are scented. Pleasant odor attracts bees and butterflies (e.g., *Nyctanthes*, *Cestrum*, etc.) or unpleasant odor attracts flies and beetles (e.g., *Rafflesia*, *Aristolochia*, etc.). The most orchids offer rewards to the pollinators.

Answer (1)

72. Functional megaspore in an angiosperm develops into

- (1) endosperm. (2) embryo sac.
(3) embryo. (4) ovule.

72. In most angiosperm plants, only one megaspore is functional which later develops into an embryo sac. Hence, megaspore is the first cell of the female gametophyte (embryo sac).

Answer (2)

73. Which of the following in sewage treatment removes suspended solids?

- (1) Secondary treatment (2) Primary treatment
(3) Sludge treatment (4) Tertiary treatment

73. In primary treatment, the filtered water is passed through a series of sedimentation tanks, where small particles (soil and pebbles) called grit settle out. Some coagulants may be added to aid faster and better sedimentation. This process removes about 50% of the solid matter that is known as primary sludge.

Answer (2)

74. Presence of plants arranged into well-defined vertical layers depending on their height can be seen best in

- (1) Tropical rain forest (2) Grassland.
(3) Temperate forest. (4) Tropical Savannah

74. Stratification is vertical distribution of different species occupying different levels in biotic community. Stratification occurs within forests due to availability of light which results in three or more vertical strata of plants an herb layer, a shrub layer, a small tree layer, and a canopy tree layer in the forest. It is found in tropical rain forest and deciduous forests.

Answer (1)

75. Which of the following is made up of dead cells?

- (1) Collenchyma (2) Phellem
(3) Phloem (4) Xylem parenchyma

75. The cork cambium (phellogen) is a lateral meristem which produces dead cells or cork (phellem) towards outside and living cells of secondary cortex (phelloderm) towards inner side.

Answer (2)

76. Zygotic meiosis is characteristic of

- (1) *Fucus*. (2) *Funaria*.
(3) *Chlamydomonas*. (4) *Marchantia*.

76. On the basis of stage at which meiosis occurs, it is classified into zygotic meiosis in which the zygote undergoes meiosis to produce haploid organisms (e.g., *Chlamydomonas*, *Ulothrix*).

Answer (3)

77. MALT constitutes about _____ of the lymphoid tissue in human body.
(1) 20% (2) 70%
(3) 10% (4) 50%

77. Secondary lymphatic organs and tissues are the sites where most immune responses occur and include lymph nodes, spleen and lymphatic nodules or follicles. MALT (Mucosa Associated Lymphoid Tissue) constitutes about 50% of the lymphoid tissues in human body.

Answer (4)

78. Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of
(1) inspiratory reserve volume. (2) tidal volume.
(3) expiratory reserve volume. (4) residual volume.

78. Even after the expiratory reserve volume is expired, considerable air remains in the lungs because the sub atmospheric intrapleural pressure keeps the alveoli slightly inflated, and some air also remains in the non-collapsible airways. This volume is called the residual volume. It amounts to about 1100 mL to 1200 mL.

Answer (4)

79. In case of *Poriferans*, the spongocoel is lined with flagellated cells called
(1) oscula. (2) choanocytes.
(3) mesenchymal cells. (4) ostia.

79. The inner cavity of the sponge is lined by specialized, flagellated cells called collar cells or choanocytes. The flagella of the collar cells beat to create a current of water that flows from the outside of the sponge, through the pores, into the interior cavity called spongocoel.

Answer (2)

80. Which one of the following is related to *Ex-situ* conservation of threatened animals and plants?
(1) Biodiversity hot spots (2) Amazon rainforest
(3) Himalayan region (4) Wildlife Safari parks

80. The best method of maximizing a species chance of survival (when *ex situ* methods are required) is by relocating part of the population to a less threatened location. Collecting wild and domesticated organisms in botanical gardens, nurseries, aquaria and zoos/ wildlife safari parks, etc., are examples of offsite collection.

Answer (4)

81. Which of the following RNAs should be most abundant in animal cell?
(1) t-RN (2) m-RNA
(3) mi-RNA (4) r-RNA

81. r-RNA is the most abundant RNA in the animal cell. It comprises of about 80% in the cytoplasm of the cell.

Answer (4)

82. Which statement is wrong for Krebs' cycle?
(1) There is one point in the cycle where FAD^+ is reduced to $FADH_2$.

- (2) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesized.
- (3) The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid.
- (4) There are three points in the cycle where NAD^+ is reduced to $\text{NADH} + \text{H}^+$.

82. Acetyl group from acetyl CoA is condensed with four-carbon oxaloacetate and water by the enzyme citrate synthase to form citric acid. One complete round of TCA cycle or krebs' cycle yields 2 molecules of CO_2 , 3NADH, 1FADH₂ and 1 high-energy compound (GTP or ATP).

Answer (3)

- 83.** Hypersecretion of growth hormone in adults does not cause further increase in height, because
- (1) epiphyseal plates close after adolescence.
 - (2) bones lose their sensitivity to growth hormone in adults.
 - (3) muscle fibers do not grow in size after birth.
 - (4) growth hormone becomes inactive in adults.

83. Hypersecretion of GH during adulthood is called acromegaly. It is generally not noticed for several years and only becomes distinct when visible symptoms start appearing. Although GH cannot produce further lengthening of the long bones i.e. height remains same, the bones of the hands, feet, cheeks and jaws thicken and other tissues enlarge. Further, size of eyelids, lips, tongue and nose increase, the skin thickens and furrows develop the forehead and soles.

Answer (1)

- 84.** Plants which produce characteristic pneumatophores and show vivipary belong to
- (1) halophytes.
 - (2) psammophytes.
 - (3) hydrophytes.
 - (4) mesophytes.

84. Halophytes are the plants that tolerate high salinities. Plants in mangrove forests are subjected to anaerobic condition; hence they developed special adaptations like pneumatophores (for drawing atmospheric oxygen), prop roots, stilt roots (for support in wetlands) and vivipary (seed germination while on tree).

Answer (1)

- 85.** Asymptote in a logistic growth curve is obtained when
- (1) $K = N$
 - (2) $K > N$
 - (3) $K < N$
 - (4) The value of 'r' approaches zero

85. The density of a population (N) shows a declining phase (negative acceleration phase due to declining birth rate or rising death rate) and stabilizes (asymptote, where it reaches the carrying capacity (K), that is, stationary phase). This stage indicates the zero population growth phase where the natality rate approximately equals the mortality rate.

Answer (1)

- 86.** Good vision depends on adequate intake of carotene rich food. Select the best option from the following statements.
- (a) Vitamin A derivatives are formed from carotene.
 - (b) The photo- pigments are embedded in the membrane discs of the inner segment.
 - (c) Retinal is derivative of Vitamin A.
 - (d) Retinal is a light absorbing part of all the visual photopigments.

Options:

- (1) (a), (c) and (d)
- (2) (a) and (c)
- (3) (b), (c) and (d)
- (4) (a) and (b)

86. β -carotene gets converted to vitamin A (retinol) which is vital for good vision and strong immune system. The photopigment present in rods is called rhodopsin or visual purple. It is a purplish-red protein composed of opsin and retinal. Opsin is a glycoprotein, while retinal is a derivative of vitamin A called retinal. The absorption of light by a photopigment (rhodopsin and cone photopigments) results in structural changes in them and initiates the events that lead to the production of a receptor potential. Retinal is the light-absorbing part of all visual photopigments.

Answer (1)

87. Artificial selection to obtain cows yielding higher milk output represents
- (1) directional as it pushes the mean of the character in one direction.
 - (2) disruptive as it splits the population into two, one yielding higher output and the other lower output.
 - (3) stabilizing followed by disruptive as it stabilizes the population to produce higher yielding cows.
 - (4) stabilizing selection as it stabilizes this character in the population.

87. The success of a farm depends on proper selection of animals for mating. Even if all the conditions are met, a poor quality individual used for mating will reduce the profit of a commercial venture. The following are the important characteristics of selecting good quality breeds.

Milk yield is chiefly dependent on the quality of breeds in the farm. The breeds should be able to yield more milk than the others in a given time and under given climatic conditions. The low yielding varieties should be weeded out. This will increase the profitability of the business. It represents the directional as it pushes the mean of the character in one direction.

Answer (1)

88. Frog's heart when taken out of the body continues to beat for some time. Select the best option from the following statements.
- (a) Frog is a poikilotherm.
 - (b) Frog does not have any coronary circulation.
 - (c) Heart is myogenic in nature.
 - (d) Heart is auto-excitabile.

Options:

- | | |
|-----------------|-----------------|
| (1) Only (d) | (2) (a) and (b) |
| (3) (c) and (d) | (4) Only (c) |

88. The nodal tissues auto regulates the normal activities of the heart. The impulse begins in the heart muscles. This is the reason why the heart is called myogenic. For example, in Molluscs and vertebrates (frog). A myogenic heart keeps beating even after removal under optimum conditions.

Answer (3)

89. Select the mismatch:

- | | | |
|----------------------|---|---------------|
| (1) <i>Cyas</i> | - | Dioecious |
| (2) <i>Salvinia</i> | - | Heterosporous |
| (3) <i>Equisetum</i> | - | Homosporous |
| (4) <i>Pinus</i> | - | Dioecious |

89. Coniferophyta is characterized by profusely branched stem, simple smaller leaves, relatively smaller pith and cortex, much more amount of wood. It resembles conifers and is monoecious with compact strobili and erect trunk. Examples include *Dadoxylon*, *Cordaites*, *Ginkgo biloba*, *Cedrus*, *Pinus*, *Sequoia*.

Answer (4)

90. Which one from those given below is the period for Mendel's hybridization experiments?

(1) 1840 – 1850

(2) 1857 - 1869

(3) 1870 – 1877

(4) 1856 - 1863

90. Gregor Johann Mendel explained the underlying principles of heredity and variation through his famous hybridization experiments performed 1856-1865 on the garden pea plant, *Pisum sativum*, using the monastery garden. He was aptly called the *Father of Genetics* because the genetics science was born in his monastery garden.

Answer (2)

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