

CHAPTER 2 - BIOLOGICAL CLASSIFICATION

? Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Q. 1. Assertion: Unicellular algae been not kept in kingdom Protista by Whittaker.

Reason: A distinction between unicellular and multicellular organisms is not possible in case of algae.

Ans. Option (a) is correct.

Explanation: A distinction between unicellular and multicellular organisms is not possible in case of algae. It is because of this unicellular green algae have not been included in kingdom Protista by Whittaker. Unicellular algae forms are placed in kingdom Protista but unicellular green algae are placed in Kingdom Plantae and not included in Protista due to their resemblance with other green algae.

AI Q. 2. Assertion: Mycoplasma are often called as PPLO (pleuropneumonia like organisms).

Reason: They are the simplest unicellular prokaryotes.

Ans. Option (b) is correct.

Explanation: Mycoplasma are the simplest unicellular prokaryotes. They are often called as PPLO (pleuropneumonia like organisms) because they were first isolated from pleural fluids of cattle suffering from pleuropneumonia.

Q. 3. Assertion: *Trichoderma*, *Colletotrichum* are called 'Imperfect fungi'.

Reason: Sexual reproduction is absent in these forms.

Ans. Option (a) is correct.

Explanation: *Trichoderma*, *Colletotrichum* are called as imperfect because sexual reproduction is absent in these forms.

AI Q. 4. Assertion: Viruses are considered organism.

Reason: Viruses are nucleoproteins that lack cell organelles.

Ans. Option (d) is correct.

Explanation: Viruses are not considered organism as they have no independent machinery.

Q. 5. Assertion: Lichens are said to be dual organisms.
Reason: They show a symbiotic association between a fungus and an alga.

Ans. Option (a) is correct.

Explanation: Lichens are said to be dual organisms because they show a symbiotic association between a fungus and an alga.

Q. 6. Assertion: Some fungi are called as 'imperfect fungi'.

Reason: Sexual reproduction is absent in some forms of fungi.

Ans. Option (a) is correct.

Explanation: The class deuteromycetes in fungi are known as "imperfect fungi" due to absence of sexual reproduction.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following to answer any four questions from (i) to (v) given below:

Linnaeus gave two kingdom classification, which consists of kingdom Plantae and kingdom Animalia. This classification was based on the mode of nutrition, reproduction, presence or absence of cell wall. However, this system had many drawbacks like there was no distinction between eukaryotes and prokaryotes. Then, came the three kingdom classification in which single-celled bacteria and protozoans were kept in kingdom Protista. This system also failed to classify all living organisms into appropriate categories. Finally a five Kingdom classification was proposed by dividing all the organisms into five kingdom and it will be accepted as modern system of classification.

(i) Biologist who proposed the term *protista* for unicellular organisms is :

- (a) Lister
- (b) Pasteur
- (c) Haeckel
- (d) Koch

(ii) All eukaryotic unicellular organisms belong to :

- (a) Monera
- (b) Protista
- (c) Fungi
- (d) Bacteria

(iii) Organisms having characteristic of both plants and animals is :

- (a) *Paramecium*
- (b) *Euglena*
- (c) *Mycoplasma*
- (d) Bacterium

iv) The five kingdom classification was proposed by:

- (a) R. H. Whittaker
- (b) C. Linnaeus
- (c) A. Roxburg
- (d) Virchow

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: The five kingdom classification is based on the mode of nutrition of organisms.

Reason: The organisms are placed in different group based on the cellular organization.

Ans. (i) (c) Haeckel

(ii) (b) protista

(iii) (b) *Euglena*

Explanation: *Euglena* is heterotrophic and also possess chlorophyll like plants to synthesize their food.

(iv) (a) R. H. Whittaker

(v) (b) The five kingdom classification is based on prokaryotic & eukaryotic cell; unicellular and multicellular organization; mode of nutrition; body organization and so on.

Q. 2. Read the following to answer any four questions from (i) to (v) given below:

Sarcodines are unicellular, jelly-like protozoa found in fresh or sea water and in moist soil. Their body lacks a periplast. Therefore, they may be naked or covered by a calcareous shell. They usually lack flagella and have temporary protoplasmic outgrowths called pseudopodia. These pseudopodia or false feet help in movement and capturing prey. They include free living forms such as *Amoeba* or parasitic forms such as *Entamoeba*. Zoo flagellates and parasitic sporozoans are other groups of protozoan protists. They are all unicellular and heterotrophic. They may be holozoic, saprobic or parasitic.

(i) Which of the following is a flagellated protozoan.

- (a) *Amoeba*
- (b) *Entamoeba*
- (c) *Plasmodium*
- (d) *Trypanosoma*

(ii) The basis of protozoan classification is:

- (a) Shape
- (b) Locomotion
- (c) Measurement
- (d) Number of nuclei

(iii) Which of the following is not the locomotory organ of protozoa.

- (a) Cilia
- (b) Flagella
- (c) Parapodia
- (d) Pseudopodia

(iv) Protozoan group with two nuclei, macronucleus & micronucleus is :

- (a) Flagellata
- (b) Sarcodina
- (c) Ciliata
- (d) Sporozoa

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: The heterotrophic protists are found as saprophytes, parasites and predators.

Reason: Heterotrophic protists are eukaryotic and mostly unicellular except few protists.

Ans. (i) (d) *Trypanosoma*

(ii) (b) Locomotion

Explanation: Protozoan are eukaryotic having different shape and size. Some are ciliated flagellated or both may be absent.

(iii) (d) Pseudopodia

Explanation: Pseudopodia are the locomotory organ of *Amoeba*. Protozoa have cilia and flagella as their locomotory organ.

(iv) (c) Ciliata

(v) (b) **Explanation:** Protista are unicellular and eukaryotic organisms. They can have different mode of nutrition like saprophytes, parasites and predators while autotrophic green algae possess chlorophyll to synthesize their own food.

AI Q.3. Read the following to answer any four questions from (i) to (v) given below:

Lichens are the composite or dual organisms representing a symbiotic association between

a fungus and alga. The fungal partner is called mycobiont whereas algal partner is called phycobiont. Algae prepares food for fungi and fungi provides shelter and absorbs mineral nutrient and water for its partner. Lichens grow on barren rocks, cooled volcanic lava and icy tundra soils. They can tolerate extreme desiccation and are pioneers of rock vegetation. They are very sensitive to air pollution and do not grow in polluted area. They are very good pollution indicators. Certain lichens are source of food for grazing animals.

(i) Mycobiont and phycobiont are found in _.

- (a) Mycorrhiza
- (b) Root
- (c) Lichen
- (d) BGA

(ii) An association of roots of higher plants and fungi is called:

- (a) Lichen
- (b) Fern
- (c) Mycorrhiza
- (d) BGA

(iii) Lichens are described as indicators of _.

- (a) air pollution
- (b) water pollution
- (c) soil pollution
- (d) agricultural productivity

(iv) Most of the lichens are formed by _.

- (a) Blue-green algae and club fungi
- (b) Blue-green algae and sac fungi
- (c) Red algae and sac fungi
- (d) Brown algae and algal fungi

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Lichens are both algal and fungal cells that act as pollution indicator.

Reason: Lichens grow very fast at the rate of about 2 cm per year.

Ans. (i) (c) Lichen

(ii) (c) Mycorrhiza

(iii) (a) air pollution

(iv) (b) Blue-green algae and sac fungi

(v) (c) **Explanation:** Lichens are the pollution indicator that do not show growth in the polluted air with sulphur dioxide. They grow at very slow rate upto 1 mm per year.

? Objective Type Questions

ASSERTION- REASON TYPE QUESTIONS

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- (c) A is true but R is false.
- (d) Both A and R are false.

Q. 1. Assertion: Red algae contribute in producing coral reefs.

Reason: Some red algae secrete and deposit calcium carbonate over their walls.

Ans. Option (a) is correct.

Explanation: Red algae contribute in producing coral reefs as they secrete and deposit calcium carbonate over their walls. As for example red algae coralline algae deposit CaCO_3 in their cell wall coral reef is made of thin layers of CaCO_3 .

Q. 2. Assertion: *Selaginella*, *Salvinia* and *Marsilea* show heterospory.

Reason: They produce two kinds of spores- microspores and macrospores.

Ans. Option (a) is correct.

Explanation: Heterospory is the production of two kinds of spores and is the first step towards seed habit. Pteridophytes such as *Selaginella*, *Salvinia* and *Marsilea* produce two kinds of spores- microspores and macrospores.

Q. 3. Assertion: Coralloid roots are feature of *Cycas* plant.

Reason: These are specialized roots, which grow on the surface of soil.

Ans. Option (b) is correct.

Explanation: Coralloid roots are feature of *Cycas* plant. They are specialized roots, which grow on the surface of soil because they are apogeotropic.

Q. 4. Assertion: Bryophytes are successful land plants.

Reason: They grow successfully on land but require water for completion of their life cycle.

Ans. Option (d) is correct.

Explanation: Bryophytes are amphibians of plant kingdom. They grow on moist habitats and require water for reproduction.

AI Q. 5. Assertion: Some Bryophytes are called liverworts.

Reason: Some Bryophytes are called as liverworts because their sporophyte resembles with liver lobes.

Ans. Option (c) is correct.

Explanation: Some bryophytes are called as liverworts because their gametophytic thalli resemble liver lobes.

Q. 6. Assertion: The gymnosperms are heterosporous.

Reason: They produce diploid microspores within sporangia.

Ans. Option (c) is correct.

Explanation: Gymnosperms produce haploid microspore within microsporangia.

? Visual Case-Based Questions

(4 marks each)

AI Q. 1. Read the following to answer any four questions from (i) to (v) given below:

In pteridophytes the sporophyte produces spores through meiosis. The spores are produced by the sporangia in the spore mother cells. These spores germinate to give rise to gametophytes. The gametophytes bear male and female sex organs. Water is required for transfer of antherozoids - the male gametes released from the male sex organ to the mouth of female sex organ. Fusion of male gamete with the egg result in the formation of zygote. Zygote thereafter produces a multicellular well-differentiated sporophyte. In majority of the pteridophytes all the spores are of similar kinds. However, some genera also produce two kinds of

spores, macro (large) and micro (small) spores. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively. In these plants, the female gametophytes are retained on the parent sporophytes for variable periods. The development of the zygotes develop into young embryos within the female gametophytes. This event is a precursor to the seed habit considered an important step in evolution.

- (i) The gametophytes are called as _____.
- (a) thalli
 - (b) prothallus
 - (c) strobilus
 - (d) liverworts

(ii) In pteridophytes the dominant form of life is the _____.

- (a) gametophyte
- (b) haploid
- (c) sporophyte
- (d) triploid

(iii) Pteridophytes are _____ plants.

- (a) homosporous
- (b) heterosporous
- (c) homosporous and heterosporous
- (d) megasporous

(iv) In pteridophytes the male and female sex organ of the gametophytes are called _____, respectively.

- (a) anthers and archegonia
- (b) archegonia and antheridia
- (c) archegonia and anthers
- (d) antheridia and archegonia

(v) Direction: In the above questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: In pteridophytes, sporophytic and gametophytic phases are independent.

Reason: The sporophytic plant bears sporangia on the lateral side of leaf-like appendages called sporophylls.

Ans. (i) (b) prothallus

Explanation: It bears sex-organs and represents the gametophyte phase in the life cycle of pteridophytes.

(ii) (c) sporophyte

Explanation: In pteridophytes the dominant phase is sporophyte which represents main plant body differentiated into root stem and leaves. Gametophyte is small and short lived. Life cycle is diplohaplontic type.

(iii) (c) Homosporous and heterosporous

Explanation: If all the spores are of similar kind, the condition is homosporous whereas if they are of two types it is called heterosporous.

(iv) (d) Antheridia and archegonia

Explanation: Antheridia produce male of archegonia egg or female gametes.

(v) (c) A is true but R is false.

Explanation: Sporangia are not borne on lateral side of sporophylls. They are produced adaxially or on the ventral surface of sporophylls.

Q. 2. Read the following to answer any four questions from (i) to (v) given below:

Gametophyte is a dominant phase in the life cycle of a bryophyte. It is more conspicuous, long living, independent, green and freely branched whereas,

the sporophytic phase is short lived and dependent upon the gametophyte. The main plant body is haploid and bears sex organs i.e., antheridium and archegonium. Antheridium produces a large number of flagellated male gametes called antherozoids and archegonium is flask shaped with tubular neck and swollen venter. The gametophytic plant body of bryophytes is thalloid in liverworts whereas foliose in mosses. In liverworts, the thallus is differentiated into a dorsal photosynthetic and ventral storage region. In mosses, the gametophyte has two growth stages-protonema stage and leafy stage or gametophore.

(i) Protonema is _____.

- (a) Haploid and in mosses.
- (b) Diploid and in liverworts.
- (c) Haploid and in pteridophytes.
- (d) Haploid and in pteridophytes.

(ii) Bryophytes require water in their habitat for _____.

- (a) Filling archegonia for fertilization.
- (b) Vegetative propagation.
- (c) Swimming of sperms to egg in archegonium.
- (d) Their homosporous nature.

(iii) In a moss, sporophyte

- (a) Manufactures food for itself as well as for gametophyte.
- (b) Is partially parasitic on gametophyte.
- (c) Produce gametes that give rise to gametophyte.
- (d) Arises from a spore produced from the gametophyte.

(iv) Plants which produce spores and embryo but lack vascular tissue and seeds are

- (a) Bryophytes
- (b) Pteridophytes
- (c) Gymnosperm
- (d) Algae

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Moss protonema resemble green alga.

Reason: It develops unicellular sex-organs.

Ans. (i) (a) Haploid and found in mosses.

Explanation: Protonema is a juvenile filamentous stage of moss gametophyte.

(ii) (c) Swimming of sperms to egg in archegonium

Explanation: Bryophytes are amphibians of plant kingdom. They grow in soil but require water for sexual reproduction. Their sperms require water to swim into the egg.

(iii) (b) Moss sporophyte is partially parasitic on gametophyte.

Explanation: Moss sporophyte remain attached on gametophyte and absorb nutrient from it. It becomes green in some region and thus becomes photosynthetic and prepares its own food, thus it is partially parasitic on gametophyte.

(iv) (a) Plants producing spores and embryo but lacking vascular tissue are bryophytes.

Explanation: Bryophytes are nonvascular embryophytes.

(v) (c) A is true but R is false.

Explanation: Moss protonema unlike green alga bears oblique septa and produces, not sex-organs, but gametophores.

AI Q. 3. Read the following to answer any four questions from (i) to (v) given below:

Angiosperms reproduce sexually. During this process, one male gamete fuses with the egg cell to form diploid zygote. This process is known as fertilization or syngamy. The second male gamete then fuses with the diploid secondary nucleus and forms the triploid primary endosperm nucleus (PEN). This fusion is known as triple fusion. Since, two types of fusion, syngamy and triple fusion takes place in an embryo sac of angiosperms, this event is known as double fertilization. The zygote then develops into embryo and PEN develops into endosperm, which provides nourishment to the developing embryo.

(i) Embryo sac of angiosperms is made up of _.

(a) 8 cells.

(b) 7 cells or 8 nuclei.

(c) 8 nuclei.

(d) 7 cells or 7 nuclei.

(ii) If the diploid number of a flowering plant is 32. What would be the chromosome number in the endosperm.

(a) 32

(b) 16

(c) 48

(d) 64

(iii) Double fertilization is found with out any exception in _.

(a) Bryophytes

(b) Gymnosperms

(c) Angiosperms

(d) Pteridophytes

(iv) Endosperm in angiosperm is mostly _.

(a) Haploid

(b) Diploid

(c) Triploid

(d) Polyploid

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true but R is false.

(d) Both A and R are false.

Assertion: Siphonogamy is a mode of pollination.

Reason: It is required for the fusion of male and female gametes.

Ans. (i) (b) 7 cells or 8 nuclei

Explanation: Mature Embryo sac has 3 celled egg apparatus, 3 antipodals and a secondary nucleus.

(ii) (c) 48

Explanation: It is because endosperm is triploid (3n). $[2n=32, n=16, 3n=16 \times 3=48]$

(iii) (c) Angiosperms

Explanation: It is characteristic of angiosperms only and not found in any other group of plant kingdom.

(iv) (c) Triploid

Explanation: It is triploid because it develops from the primary endosperm nucleus which is triploid.

(v) (b) Both A and R are true, but R is not the correct explanation of A.

Explanation: When the pollen tube facilitates the passage of male gametes to the egg, it is called siphonogamy.

CHAPTER 4 - ANIMAL KINGDOM

Objective Type Questions

ASSERTION- REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

(1 mark each)

Read both the statements and choose the correct option from the following.

(a) Both A and R are true, and R is the correct explanation of A.

- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Q. 1. Assertion: Cnidarians, Ctenophorans, and Echinodermites show radial symmetry.

Reason: Their body can be divided into two equal halves by cutting it in any plane passing through the central axis.

Ans. Option (a) is correct.

Explanation: Cnidarians, ctenophorans, and echinodermites show radial symmetry because their body can be divided into two equal halves by cutting it in any plane passing through the central axis.

AI Q. 2. Assertion: An anti-coagulant hirudin is present in salivary glands of leech.

Reason: It leads to blood clotting while the leech is feeding.

Ans. Option (c) is correct.

Explanation: An anti-coagulant hirudin is present in salivary glands of leech. It prevents the blood from clotting while the leech is feeding.

Q. 3. Assertion: Fishes belonging to class Osteichthyes have to swim constantly.

Reason: Air bladder is present in these fishes.

Ans. Option (d) is correct.

Explanation: Fishes belonging to class Chondrichthyes have to swim constantly. It is because air bladder is absent in these fishes therefore, they have to swim constantly to avoid sinking.

Q. 4. Assertion: Birds are oviparous.

Reason: Oviparous animals give birth to young ones of their own kind.

Ans. Option (c) is correct.

Explanation: Oviparous are animals which lay eggs e.g., Reptiles, birds, etc.

Q. 5. Assertion: Whale is a mammal.

Reason: They respire with the help of lungs only.

Ans. Option (a) is correct.

Explanation: Whale is a mammal. The hairs on its body are lost due to aquatic adaptation. They respire with the help of lungs only.

Q. 6. Assertion: All chordates are vertebrates.

Reason: They possess a notochord, dorsal, hollow nerve cord and have pharyngeal gill clefts in some stage of their life cycle.

Ans. Option (d) is correct.

Explanation: All chordates are not vertebrates: Vertebrates have vertebral column but protochordates and agnatha have notochord that is not replaced by vertebral column.

AI Q. 7. Assertion: The fishes belonging to class Chondrichthyes must swim constantly.

Reason: They possess four pairs of gills which are covered by an operculum on each side.

Ans. Option (c) is correct.

Explanation: The fish belonging to class Chondrichthyes have to swim constantly because air bladder is absent in these fishes therefore, they have to swim constantly to avoid sinking. In these fish, gill slits are separate and not covered by operculum.

? Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following to answer any four questions from (i) to (v) given below:

Amphibians are the first tetrapods to invade the land. The juvenile phase of the life cycle is dependent on water, where gas exchange occurs through gills. Amphibians have aquatic larval life and terrestrial adult life. Respiration is by gills, lungs and skin. Their body is divisible into head and trunk and skin is moist without scales. The two pairs of limbs are used for locomotion except for caecilians. They are cold blooded animals. Respiration is by gills (in larva), lungs and skin (in adults). Amphibians have a three-chambered heart. Fertilisation is external. However, in Salamander and Ichthyophis fertilization is internal. They are mostly oviparous, except for Salamander, which is viviparous. Development is indirect.

(i) Amphibians are cold blooded animals hence, they are called _____ animals.

- (a) Homeothermic
- (b) Homoiothermic.

- (c) Poikilotherms
- (d) Homothermic

(ii) All amphibians use two pairs of limbs for locomotion, however, _____ is a limbless amphibia.

- (a) Bufo
- (b) Salamandra (Salamander)
- (c) Hyla
- (d) Ichthyophis

(iii) In some amphibians even after attaining sexual maturity, larval characters are retained. It is known as _____.

- (a) Phylogenesis
- (b) Neoteny
- (c) Parthenogenesis
- (d) Ontogenesis

(iv) Croaking of frog is _____.

- (a) Hunger call
- (b) Sex call for female
- (c) Danger call
- (d) Musical note

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
 (b) Both A and R are true, but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) Both A and R are false.

Assertion: Amphibians usually hibernate in winter and undergo aestivation in summer.

Reason: They are poikilothermic animals.

Ans. (i) (c) Poikilotherms

Explanation: They are cold blooded animals. Their body temperature vary with the varying environment.

(ii) (d) *Ichthyophis*

Explanation: It is an unusual amphibian. They have worm like body with out legs. Limbless amphibians are also named as caecilians.

(iii) (b) Neoteny

Explanation: It is the retention of juvenile features in the adult animal, or the sexual maturity of an animal while it is still is a larval state.

(iv) (b) Sex call for female

Explanation: This is the sound given by male frog during breeding season for attracting female frog.

(v) (a) Both A and R are true, and R is the correct explanation of A.

Explanation: Amphibians are cold blooded animal. They can not regulate their body temperature with changing environment.

AI Q. 2. Read the following to answer any four questions from (i) to (v) given below:

The members of phylum Annelida are known as "the segmented worms". Their body is metamerically segmented. They are triploblastic and coelomate animals. The excretory units of these invertebrates are coiled tubules, the nephridia. They help in osmoregulation.

Example: *Nereis*, *Pheretima* and *Hirudinaria*.
Body Symmetry: Segmented worms have the typical metameric segmentation. Their body consists of segments called somites or metameres and ring like grooves known as annuli. They have bilateral symmetry.

Mode of Respiration: Respiration in annelids occurs through the skin. In some, gills are present.

(i) Metamerism is characteristic of _.

- (a) Porifera
 (b) Platyhelminthes
 (c) Annelida
 (d) Mollusca

(ii) Which is false about annelids:

- (a) Clitellum
 (b) Pseudocoelom

(c) Nephridia

(d) Metameric Segmentation

(iii) Earthworms have how many segments ?

- (a) 85-400
 (b) 100-200
 (c) 20-95
 (d) 115-120

(iv) Nephridia of earthworm are analogous to _____.

- (a) Tracheae of insects.
 (b) Gills of Prawn.
 (c) Nematoblasts of *Hydra*
 (d) Flame cells of *Dugesia*

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

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 (b) Both A and R are true, but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) Both A and R are false.

Assertion: Earthworms are ammonotelic when plenty of water is available.

Reason: Main excretory product in earthworm is urea.

Ans. (i) (d) Annelida

Explanation: In some animal like earthworms the body is divided into similar segments with a serial repetition of some organs. This is called metamerism.

(ii) (b) Pseudocoelom

Explanation: When the body cavity is not derived from mesoderm or in a true coelom it is called pseudocoelom.

(iii) (d) 115-120

Explanation: These segments are similar and called as metameres or somiles.

(iv) (d) Flame cells of *Dugesia*

Explanation: Flame cells function like kidney is removing waste materials and thus help in excretion. They are found in phylum Platyhelminthes.

(v) (b) Explanation: Main excretory product in earthworm is urea but when plenty of water is available the earthworm is ammonotelic i.e. they excrete some amount of ammonia.

Q. 3. Read the following to answer any four questions from (i) to (v) given below:

Members of this phylum proifera are commonly known as sponges. They are asymmetrical animals. They are primitive multicellular animals with cellular level of organisation. Body wall is two layered -outer dermal layer called pinacoderm and inner gastral layer called choanoderm and cells are present in the pinacoderm and collar cells or choanocytes are present in the choanoderm. The body possess minute pores called ostia, a large

cavity called spongocoel and a pore called osculum. They have a water canal system. Water enters through minute pores called ostia in the spongocoel and from the spongocoel goes out through the osculum. The body is supported by a skeleton. They are hermaphrodite and reproduce by asexual and sexual reproduction.

(i) The skeleton of sponges are composed of _____.

- (a) spicules
- (b) silica
- (c) calcium
- (d) chitin

(ii) Cells that line the inner chambers of sponges, helping water circulation to continue are _____.

- (a) nematocytes
- (b) choanocytes
- (c) amoebocytes
- (d) pinacocytes

(iii) Members of phylum Porifera are

- (a) Only freshwater animal.
- (b) Only marine animals.
- (c) Mostly freshwater animals but few are marine entities.
- (d) Mostly marine animals but few are freshwater entities.

(iv) Sponges gather food particles with the help of specialised _____ collar cells.

- (a) spiked
- (b) flat
- (c) flagellated
- (d) ciliated

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put

forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Canal system of sponges helps in nutritions.

Reason: The current of water which flows through canal system brings food to sponges.

Ans. (i) (a) spicules

Explanation: The spicules are made up of calcium carbonate, silica and spongin fibres which together form the endoskeleton of sponges.

(ii) (b) choanocytes

Explanation: The choanocytes carry out a variety of functions including water circulation capturing food and assisting in reproduction.

(iii) (d) Mostly marine animals but few are freshwater entities.

Explanation: Porifera members are generally marine but a few are found in fresh water e.g. the members of sponge family spongillidae.

(iv) (c) flagellated

Explanation: When the water current passes through the channels inside the sponge with the help of flagellated bacteria of tiny particles are taken up from the water as food.

(v) (b) Explanation: The canal system of sponges helps not only for gathering food but also for respiratory exchange and removal of waste products.

□□□

CHAPTER 5 - MORPHOLOGY OF FLOWERING PLANTS

Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

[AI] Q.1. Assertion: Pneumatophore roots helps in gaseous exchange.

Reason: They bear small pores called lenticels (pneumathodes) near their tips.

Ans. Option (a) is correct.

Explanation: Pneumatophore roots bear small pores called lenticels (pneumathodes) near their tips, which help in gaseous exchange.

[AI] Q.2. Assertion: Leaves of monocot plants show reticulate venation.

Reason: When the veinlets form a network, the venation is termed as reticulate venation.

Ans. Option (d) is correct.

Explanation: Leaves of monocot plants shows parallel venation while leaves of dicot plants show reticulate venation.

Q. 3. Assertion: Mustard and China rose has hypogynous flowers.

Reason: In hypogynous flowers, ovary is said to be inferior.

Ans. Option (c) is correct.

Explanation: In hypogynous flowers, ovary is said to be superior while in epigynous flowers, ovary is inferior.

Q. 4. Assertion: Apple is a true fruit.

Reason: In apple, thalamus and perianth take part in fruit formation.

Ans. Option (d) is correct.

Explanation: Apple is a false fruit. It develops from parts other than ovary.

Q. 5. Assertion: Pea has vexillary type of aestivation.

Reason: In this type of aestivation, the posterior petal is the largest and covers almost the two lateral petals, and the latter in their turn, nearly overlap the two anterior or smallest petals.

Ans. Option (a) is correct.

Explanation: In vexillary type of aestivation, the posterior petal is the largest and covers almost the two lateral petals, and the latter in their turn, nearly overlap the two anterior or smallest petals. E.g. pea. This type of gestational is also called as descending imbricate aestivation.

Q. 6. Assertion: Maize grain is called fruit.

Reason: It develops from ripened ovary, which contains ripened ovule.

Ans. Option (a) is correct.

Explanation: Maize grain is called fruit as it develops from ripened ovary, which contains ripened ovule. The fruit wall pericarp is fused with seed, such a fruit is called Karyopsis.

Q. 7. Assertion: The symmetry of Mustard, Datura, and Chilli flowers is actinomorphic.

Reason: The actinomorphic flowers can be divided into two similar parts only in one vertical plane.

Ans. Option (d) is correct.

Explanation: The actinomorphic flowers can be divided into two similar of equal parts from more than one median plane.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following to answer any four questions from (i) to (v) given below:

The important functions of roots are; fixation of plant in the soil i.e ground, absorption of nutrients and water from soil and conduction of absorbed materials from soil to aerial parts of the plant. In addition to the above functions, some adventitious roots perform different function i.e., in *Cuscuta* (a parasitic plant) they absorb food from the host's body; in banyan; the prop roots provide support to the plant, in maize, *Rhizophora*, they support the plant; in *Tinospora* the green roots perform the function of photosynthesis; in some plants they get swollen and perform as storage organs for the plant; other perform the function of vegetative reproduction. Some roots perform the functions of storage of food reproduction, climbing, giving the support to plant.

(i) Roots developed from parts other than radicle or called:

- (a) Tap roots
- (b) Fibrous roots
- (c) Adventitious roots
- (d) Nodular roots

(ii) Thick roots hanging down from Banyan tree are:

- (a) Prop roots
- (b) Butters roots
- (c) stilt roots
- (d) Pneumatophores

(iii) Roots are modified to haustoria in:

- (a) *Cuscuta*
- (b) *Tinospora*
- (c) *Utricularia*
- (d) *Vanda*

(iv) Tuberos roots are found in _____.

- (a) *Solanum tuberosum*
- (b) *Ipomoea batata*
- (c) *Momordica Charantia*
- (d) *Piper betel*

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Plants growing in saline swamps or mangroves near the sea shore developed pneumatophore.

Reason: Pneumatophores have pores and help in respiration.

Ans. (i) (c) Adventitious roots

Explanation: Roots which develop from parts other than radicle or which arise from an organ other than the root usually a stem of some time leaf are called adventitious roots. Root arising from radicle is the tap root.

(ii) (a) Prop roots
Explanation: These roots grow and hang down from horizontal aerial branches and provide support like pillars.

(iii) (a) *Cuscuta*
Explanation: *Cuscuta* is a parasitic plant. It develop haustorial roots which penetrate into the host plant and suck nutrients.

(iv) (b) *Ipomoea batata*
Explanation: These are the adventitious roots e.g. sweet potato which get swollen to store food.

(v) (a) Both A and R are true, and R is the correct explanation of A.
Explanation: Pneumatophores possess pores or lenticels and help in respiration by exchange of gases.

AI Q. 2. Read the following to answer any four questions from (i) to (v) given below:

Various parts of the plant such as stems leaves, and even fruits are modified into underground parts to perform various functions such as stems, leaves, and even fruits.

The stems in ginger and banana are underground and swollen due to storage of food. They are called rhizome. Rhizome of ginger is a modification of stem because it bears nodes, internodes, terminal buds, scaly leaves and buds, which give rise to aerial shoots. It is not a root because root does not have nodes and internodes. Also, rhizome does not perform the function of roots i.e. anchorage and absorption, rather it serve as reservoir for storage of food. Similarly, corm is an underground stem in *Colocasia* (jimikand) The tips of the underground stem in potato become swollen due to accumulation of food and forms tuber.

(i) Corm is a modification of

- (a) Root
- (b) Leaf
- (c) Stem
- (d) Bud

(ii) Ginger is an underground stem, It is distinguished from root because:

- (a) It lacks chlorophyll.
- (b) It stores food.
- (c) It has nodes and internodes.
- (d) It has xylem and vessels.

(iii) Example of corm is _____.

- (a) Ginger
- (b) *Colocasia*
- (c) Onion
- (d) Potato

(iv) Stem performs function of storage and perennation in _____.

- (a) Radish
- (b) Ginger
- (c) Wheat
- (d) Ground nut

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Suckers are modified green photosynthetic roots.

Reason: The roots possess mesophyll to perform photosynthesis.

Ans. (i) (c) Stem

Explanation: Corn is a modification of stem. It is a vertically growing root stock with a large apical bud.

(ii) (c) It has nodes and internodes.

Explanation: It has nodes and internodes. Such nodes and internodes are not found in the roots.

(iii) (b) *Colocasia*

Explanation: It is a modified underground stem.

(iv) (b) Ginger

Explanation: It is an under ground modification of stem of serves as reserved for storage of food and perennate during unfavourable season.

(v) (d) Both A and R are false.

Explanation: Sucker is a modified underground branch of stem and not of root. It grows below the surface of soil upto some distance and then comes out in the form of aerial shoot.

Q. 3. Read the following to answer any four questions from (i) to (v) given below:

The arrangement of veins and veinlets in the lamina of a leaf is called venation. The veins are not only the conducting channels for water, minerals and organic food, they also provide firmness to the lamina and keep it expanded. They give rise to lateral veins, which traverse the entire lamina.

Venation is of two main types: Reticulate and parallel. When the veinlets form a network, the venation is termed as reticulate venation. E.g., leaves of dicot plants. When the veins arising from mid rib or main veins, run parallel to each other towards the margin or the apex of the lamina, venation is termed as parallel venation. Present in the leaves of monocot plants. Parallel venation is of two sub-types: Pinnate of palmate type.

When lamina has a single prominent vein or midrib running from the base to the apex of lamina, e.g., Banana, *Canna*, etc. it is called pinnate or when lamina has several principal veins arising from the base and running towards the apex or margin of the lamina. it is called palmate type.

- (i) **Venation is a term used to describe the pattern of arrangement of:**
- Floral organs.
 - Flower in inflorescence.
 - Veins and veinlets in a lamina.
 - All of them.
- (ii) **If leaf has more than are prominent vein it is said to be:**
- Unicostate
 - Multicostate
 - Pinnate
 - Palmate
- (iii) **Parallel venation is characteristic in:**
- Hibiscus*
 - Solanum*
 - Salvia*
 - Maize
- (iv) **Reticulate venation is found is :**
- Canna*
 - Mango
 - Musa*
 - Rice
- (v) **Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:**
- Both A and R are true, and R is the correct explanation of A.

- Both A and R are true, but R is not the correct explanation of A.
- A is true but R is false.
- Both A and R are false.

Assertion: Leaves of *Smilax* show parallel venation.

Reason: Leave of all plants of family Liliaceae show parallel venation.

Ans. (i) (c) Veins and veinlets in a lamina.

Explanation: Venation is the distribution of veins in lamina. They contain xylem and phloem in them and therefore supply water, nutrient and food and support to the lamina.

(ii) (b) Multicostate

Explanation: This is the tips of venation is which the lamina has many principal veins arising from the base. It is also called as palmate type.

(iii) (a) Maize.

Explanation: Parallel venation is characteristics of all monocots with only a few exception.

(iv) (b) Mango

Explanation: Mango is a dicot plant. Reticulate venation is characteristic of all the dicotyledonous with a few exception.

(v) (d) Both A and R are false.

Explanation: *Smilax* leaves show reticulate venation. All the plants of a family liliaceae shows parallel venation but *Smilax* is an exception.

CHAPTER 7 - STRUCTURAL ORGANISATION IN ANIMALS

Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Q. 1. Assertion: Ciliated epithelium lines the bronchioles.
Reason: The ciliary movement maintains the flow of mucus or liquid or suspended bodies constantly in one direction.

Ans. Option (a) is correct.

Explanation: Ciliated epithelium lines the bronchioles. The ciliary movement maintains the flow of mucus or liquid or suspended bodies constantly in one direction.

Q. 2. Assertion: Pituitary gland is an exocrine gland.

Reason: Pituitary gland secretes their hormones directly releases into the blood or lymph.

Ans. Option (a) is correct.

Explanation: Endocrine glands are ductless glands which pour their secretions directly into the blood or lymph. Their secretion is known as hormones. e.g., pituitary gland, thyroid gland, etc.

Q. 3. Assertion: Cardiac muscles is a type of voluntary muscles found in heart.

Reason: Cardiac muscles work with the will of animal.

Ans. Option (d) is correct.

Explanation: Cardiac muscles does not works with the will of animal so it is involuntary characters like smooth muscles.

AI Q. 4. Assertion: Cartilage is present in the tip of nose, outer ear, joints in the vertebral column, limbs and hands in adults.

Reason: It provides support and flexibility to various parts of the body.

Ans. Option (a) is correct.

Explanation: Cartilage is present in the tip of nose, outer ear, joints in the vertebral column, limbs and hands in adults. It provides support and flexibility to various parts of the body.

Q. 5. Assertion: Nephridia are present in earthworms.

Reason: They help in respiration.

Ans. Option (c) is correct.

Explanation: Nephridia is excretory organs present in earthworm.

Q. 6. Assertion: Blood is a fluid connective tissue.

Reason: It helps in transportation of various substances between organs.

Ans. Option (a) is correct.

Explanation: Blood is a fluid connective tissue. It helps in transportation of various substances between organs.

AI Q. 7. Assertion: Stratified epithelial cells have limited role in secretion.

Reason: Stratified epithelial cells provides protection to the body against mechanical and chemical stresses.

Ans. Option (b) is correct.

Explanation: Stratified epithelial cells have limited role in secretion because it is made up of multiple layers of cells. It basically provides protection to the body against mechanical and chemical stresses.

Q. 8. Assertion: Cardiac muscle is striated. It has intercalated discs between its fibres.

Reason: It provides rhythmic contraction to the heart.

Ans. Option (a) is correct.

Explanation: Cardiac muscles occur in the walls of heart, have intercalated discs between the end of fibres. They contract rhythmically.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following to answer any four questions from (i) to (v) given below:

In multicellular organism, a group of similar cells along with intercellular substances perform a specific function. Such organization is called tissue.

Epithelial tissue provides covering or lining for some part of the body. Cells are compactly packed without intercellular space. It may be simple, compound, cuboidal or of columnar type. The connective tissues.

They are most abundant and widely distributed tissues which link and support the other tissues.

All connective tissue except blood, secretes fibres of structural protein called collagen or elastin to provide elasticity an flexibility. The cells or fibres of the connective tissue may be loosely or arranged or compactly packed. Cartilage, bones and blood are specialized connective tissue. In muscle tissue muscle is made up of long cylindrical fibres arranged parallel to each other. Fibres are composed of fine fibrils called myofibrils. Muscle fibres contract and relax in response to stimulation.

The unit of neural system is neuron. Neuroglial cell protect and supports the neuron. When neuron gets stimulated, electrical impulses are generated that travel along the plasma membrane (axon).

The tissues organize to form organs which in turn associate to form organ system in multicellular organisms.

(i) Which one of the following types of cell is involved in making of the inner walls of large blood vessels?

(a) Cuboidal epithelium

(b) Columnar epithelium

(c) Squamous epithelium

(d) Stratified epithelium

(ii) To which one of the following categories does adipose tissue belong?

(a) Epithelial

(b) Connective

(c) Muscular

(d) Neural

(iii) Which one of the following is not a connective tissue?

(a) Bone

(b) Cartilage

(c) Blood

(d) Muscles

(iv) Match the following of choose the correct option.

Column A

(a) Adipose tissue

(b) Stratified epithelium

(c) Hyaline cartilage

(d) Fluid connective tissue

Column B

(i) nose

(ii) Blood

(iii) Skin

(iv) Fat storage

(a) (a) - i, (b) - ii, (c) - iii, (d) - iv

(b) (a) - iv, (b) - iii, (c) - i, (d) - ii

(c) (a) - iii, (b) - i, (c) - iv, (d) - ii

(d) (a) - ii, (b) - i, (c) - iv (d) - iii

(v) **Direction:** In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Cartilage and bone are rigid connective tissue.

Reason: Blood is connective tissue with fluid matrix.

Ans. (i) (c) Squamous epithelium

Explanation: The tissue covering the exposed living of the body cavity is called as epithelium. This is the squamous epithelium which is involved in making of the inner walls of large blood vessels where it known as endothelium.

(ii) (b) Connective tissue

Explanation: Adipose tissue is the connective tissue. It is mainly located beneath the skin. The cells of this tissue store fat.

(iii) (d) Muscles

Explanation: Muscles is not a connective tissue. It is made up of numerous long cylindrical fine fibrils which are called myofibrils.

(iv) (b) (a) - iv, (b) - iii, (c) - i, (d) - ii

Explanation:

(a) **Adipose tissue** stores fat in the form of oil droplets and located main beneath the skin.

(b) **Stratified epithelium** occurs in the epidermis of skin.

(c) **Hyaline cartilage** It extremely strong but very flexible. Nose is composed of hyaline cartilage.

(d) **Fluid connective tissue** - Blood and lymph is the fluid connective tissue. In this type of tissue the matrix is in the liquid form.

(v) (b) Both A and R are true, but R is not the correct explanation of A.

Explanation: Blood is the fluid connective tissue where the matrix is in the liquid form.

Q. 2. Read the following to answer any four questions from (i) to (v) given below:

Earthworms have long cylindrical body divided into segments called metamerer. The ventral surface contain genital pore and dorsal surface contain mid dorsal line.

Prostomium, peristomium is the first body segment and a lobe serves as the covering for the mouth and as a wedge 14-16 segments are covered by dark band of glandular tissue called clitellum. Alimentary canal is a straight tube from first to last segment.

Vascular system is closed type, Earthworm respire through skin, respiratory organs are lacking. Single female genital pore is present on mid ventral line of 14th segments. A pair of male genital pore is present on 18th segment on ventro-lateral side.

All the segment except 1st, last and clitellum contain S-shaped setae for locomotion.

Earthworm is hermaphrodite. Two pairs of testes are present in 10th and 11th segment. Prostate and spermatic duct open to surface as male genital pore on the ventro-lateral side of the 18th segment.

One pair of ovaries is attached to the intersegmental septum of 12th and 13th segments. Female genital pore 'open on ventral side of 14th segment. Mutual exchange of sperms takes place during mating.

(i) The clitellum is a distinct part in the body of earthworm, it is found in?

- (a) Segments 13-14-15
- (b) Segments 14-15-16
- (c) Segments 12-13-14
- (d) Segments 15-16-17

(ii) Setae help in locomotion in earthworm but not uniformly present in all the segments. Select among the following that represents setae.

- (a) 1st segment
- (b) Last segment.
- (c) Clitellar segment
- (d) 20th - 22nd segment

(iii) Match the followings and choose the correct' answer:

Column A

Column B

- | | | |
|--|-------|--------------------------------------|
| (a) Hermaphrodite | (i) | Produces blood cells and hemo-globin |
| (b) Direct development | (ii) | Testis and ovary in the same animal |
| (c) Chemoreceptor | (iii) | Larval form absent |
| (d) Blood gland in earthworm | (iv) | Sense of chemical substances |
| (a) (a) - ii, (b) - iii, (c) - iv, (d) - i | | |
| (b) (a) - iii, (b) - ii, (c) - iv, (d) - i | | |
| (c) (a) - i, (b) - iii, (c) - ii, (d) - iv | | |
| (d) (a) - ii, (b) - iv, (c) - iii (d) - i | | |

(iv) Body of earthworm is divided into how many segments?

- (a) 60-120
- (b) 100-120
- (c) 80-120
- (d) 120 or more

(v) **Direction:** In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Pores found in dorsal surface of earthworm are outlets of coelom.

Reason: Coelomic fluid oozes out via dorsal pores for moistening the skin.

Ans. (i) (b) Segments 14-15-16

Explanation: Clitellum is a glandular circular band found in 14-15-16 segments. It helps in the formation of cocoons and is used in the fertilization of eggs.

(ii) (d) 20th - 22nd segment

Explanation: 20th - 22nd segment represents setae. In fact, except for the first, last clitellar segments each segment bears a ring of setae. They are chitinous of curved structures which help in locomotion.

(iii) (a) (a) - ii, (b) - iii, (c) - iv, (d) - i

Explanation:

(a) Hermaphrodite - Male and female sex organs in the same individual e.g. earthworm.

(b) Direct development - It means that there no larval stage and therefore no metamorphosis in the life cycle e.g. in *Pheretima*.

(c) Chemoreceptor These are used in securing chemical substances e.g. Olfactory receptors of taste buds in mammals.

(d) Blood gland in earthworm - These glands generate blood cells and haemoglobin.

(iv) (b) 100-120

Explanation: The body of earthworm is divided into 100-120 segments, these segments are called as metameres or somitis, external segmentation of the body correspond to the internal division. This type of segmentation is called metameric segmentation or metamerism.

(v) (a) Both A and R are true, and R is the correct explanation of A.

Explanation: Dorsal pores lead into the coelom. They permit the coelomic fluid to ooze out for keeping the skin moist.

Q.3. Read the following to answer any four questions from (i) to (v) given below:

The body of cockroach is segmented and divisible into head, thorax and abdomen. The body is covered by hard chitinous exoskeleton. In each segment, exoskeleton has hardened plates called sclerites that are joined to each other by a thin and flexible articular membrane or arthrodial membrane. Head is triangular in shape formed by fusion of six segments to show flexibility. Head bears compound eyes. At the anterior of head bears appendages forming biting and chewing type of mouth parts Thorax consists of prothorax, mesothorax and metathorax Alimentary canal is divided into foregut, mid gut and hind gut bearing Malpighian tubule. Blood vascular system is of open type. Respiratory system consists of network of trachea which open through 10 pairs of spiracles on lateral side. Cockroaches are dioecious. Male reproductive system consists of a pair of testes

one lying on each lateral side in 4th - 6th abdominal segments. The female reproductive system consists of two large ovaries situated an 2nd - 6th abdominal segments.

(i) Which one of the following statements is true for cockroach?

- (a) The number of ovarioles in each ovary are ten.
- (b) The larval stage is called caterpillar.
- (c) Anal styles are absent in females.
- (d) They are ureotelic

(ii) Match the following with reference to Cockroach and choose the correct option:

Column A

Column B

- | | |
|-------------------|--|
| (a) Phallomere | (i) Chain of developing ova. |
| (b) Gonopore | (ii) Bundles of sperm. |
| (c) Spermatophore | (iii) Opening of the ejaculatory duct. |
| (d) Ovarioles | (iv) The external genitalia. |

(a) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(b) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

(c) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)

(d) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(iii) Number of abdominal segments in male and female cockroach is:

(a) 10, 10

(b) 9, 10

(c) 10, 11

(d) 9, 9

(iv) In the mouth parts of cockroach, the galea and lacinia form parts of the _.

(a) Mandible

(b) Maxilla

(c) Labium

(d) Labrum

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true but R is false.

(d) Both A and R are false.

Assertion: Spiracles in cockroach open out into trachea.

Reason: Spiracles allow inspiration and expiration.

Ans. (i) (c) Anal styles are absent in females.

Explanation: Anal styles are a pair of short structures found in 9th segment in male cockroach and not found in female cockroach. They act as sense organs.

- (ii) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
Explanation:
 (a) **Phallomere** - External genitalia in cockroach. It is also called pseudopenis.
 (b) **Gonopore** - It is an aperture which acts as an opening of ejaculatory.
 (c) **Spermatophore** - It is a bundle of sperms produced by male cockroach.
 (d) **Ovarioles** - It contains chains of ova in female cockroach.
- (iii) (a) 10, 10
Explanation: Abdomen is the largest part of the body. It has 10 segments in the adult.

- (iv) (b) **Maxilla**
Explanation: Galea and lacinia are the parts of endopodite part of Maxilla of cockroach. Galea is outer and hood like structure while lacinia is inner and plate like structure.
- (v) (a) Both A and R are true, and R is the correct explanation of A.
Explanation: Spiracles in cockroach are small apertures of trachea i.e. they open out in trachea. Terminal parts of trachea contain fluid. This facilitate exchange of O_2 and CO_2 by diffusion.

□□□

CHAPTER 8 - CELL- THE UNIT OF LIFE

? Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

- (a) Both A and R are true, and R is the correct explanation of A.
 (b) Both A and R are true, but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) Both A and R are false.

Q. 1. **Assertion:** All cells are autonomous.

Reason: Each and every cell converts non-living materials into components of living matter.

Ans. Option (a) is correct.

Explanation: All cells are autonomous totipotent because each and every cell converts non-living materials into components of living matter.

AI Q. 2. Assertion: The statement "Omnis cellula-e-cellula" was given by Schleiden.

Reason: It means "All cells come from pre-existing cells."

Ans. Option (d) is correct.

Explanation: Rudolf Virchow gave the statement "Omnis cellula-e-cellula". It means "All cells come from pre-existing cells."

Q. 3. **Assertion:** Elaioplast is a kind of leucoplast.

Reason: It is involved in storage of oils and fats.

Ans. Option (a) is correct.

Explanation: Elaioplast is a kind of leucoplast, which are involved in storage of oils and fats.

Q. 4. **Assertion:** Nucleolus is smaller in actively working cell.

Reason: It is involved in actively synthesizing DNA that ultimately results in protein formation.

Ans. Option (d) is correct.

Explanation: Nucleolus is larger in actively working cells as it is involved in actively synthesizing RNA that ultimately results in protein formation.

AI Q. 5. Assertion: Chloroplasts are found in all the eukaryotic cells.

Reason: They perform the function of photosynthesis as they trap energy.

Ans. Option (d) is correct.

Explanation: Chloroplast is found in all green cells which perform the function of photosynthesis. It traps energy.

Q. 6. **Assertion:** Cell is the basic unit of life.

Reason: Robert Hooke discovered the cell.

Ans. Option (b) is correct.

Explanation: Cell is the basic unit of life according to cell theory. Cell was discovered by Robert Hooke for the first time.

Q. 7. **Assertion:** RER is lined with 80S ribosomes and is rough in appearance.

Reason: It is the site of lipid and steroid synthesis.

Ans. Option (c) is correct.

Explanation: RER is lined with 80S ribosomes and is rough in appearance, hence, named as rough endoplasmic reticulum. It is the site of protein synthesis and not of lipid synthesis.

Q. 8. **Assertion:** Schleiden and Schwann were the first to observe the cells to put cell theory.

Reason: The cells are always living units.

Ans. Option (d) is correct.

Explanation: This was Anton von Leeuwenhoek not Schleiden and Schwann, who was the first to give the idea of cell theory. Cells are not always living units.

? Visual Case-Based Questions

Q. 1. Read the following and answer any four questions from (i) to (v) given below:

Structure of centrosome

Centrosome is a small naked organelle found in the cytoplasm of animal cell near the outer surface of the nucleus. It consists of two bundles of microtubules called centrioles that lie at right-angles to each other. Centrioles are short cylinders and possess a whorl of 9 peripheral fibrils. The fibrils are absent in the centre. Each fibrils are made of 3 sub-fibrils. There is a proteinaceous hub in the central part of a centriole.

- (i) The main structure of centriole is:
 - (a) 9+1 fibrils
 - (b) 9+2 fibrils
 - (c) 9 triplets
 - (d) 0+9 fibrils
- (ii) How many membranes surround a centriole structure ?
 - (a) one
 - (b) two
 - (c) three
 - (d) none
- (iii) The central hub is connected to the triplets through:
 - (a) radial spokes.
 - (b) lateral spokes.
 - (c) transverse spokes
 - (d) pinhead
- (iv) Out of the two centrioles in the sperm, the distal centriole forms:
 - (a) the head
 - (b) the axial filament.
 - (c) the neck
 - (d) none of the above
- (v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:
 - (a) Both A and R are true, and R is the correct explanation of A.
 - (b) Both A and R are true, but R is not the correct explanation of A.
 - (c) A is true but R is false.
 - (d) Both A and R are false.

Assertion: Centrioles are the self-duplicating bodies. They contain DNA and RNA.

Reason: The centrioles are converted into basal bodies which give rise to cilia and flagella.

- ns. (i) (c) 9 triplets
Explanation: A pair of centrioles is surrounded by pair of dense material called centrosome. There is no membrane around the centriole.
- (ii) (d) none
Explanation: Centrioles have cart wheel like organization made up of nine triplet fibre and peripheral spokes.

(iii) (a) radial spokes.
Explanation: There are delicate strands which appear to connect sets of triplets.

(iv) (b) the axial filament.
Explanation: Neck of sperm contain distal centriole which step by step form axial filament.

(v) (a) Both A and R are true, and R is the correct explanation of A.
Explanation: Centrioles are the self-duplicating bodies because they contain DNA and RNA.

AI Q. 2. Read the following and answer any four questions from (i) to (v) given below:

Fluid mosaic model was proposed by Singer and Nicolson. According to this model, there is a central lipid bilayer of phospholipids with their polar head group towards the outside and the non-polar tails pointing inwards. Some proteins are embedded in the lipid layer are called integral or intrinsic proteins and they cannot be separated from the membrane. There are large globular integral proteins which project beyond the lipid layer on both the sides. Superficially attached proteins are called extrinsic or peripheral proteins and can be easily removed. Some membrane lipids and integral proteins remains bound to oligosaccharides which project into the extracellular fluid.

- (i) The structure of membranes is:
 - (a) Lipid rafts were predicted by early models of cell membrane structure.
 - (b) Primarily made of cholesterol molecules.
 - (c) Glycoproteins on the cell surface are necessary for immune recognition.
 - (d) All of the above.
- (ii) The passage of substances across the cell membrane occurs by:
 - (a) Active transport
 - (b) Passive transport
 - (c) Bulk transport
 - (d) All of the above
- (iii) Who proposed the fluid mosaic model of plasma membrane?
 - (a) Camillo Golgi
 - (b) Schleiden and Schwann
 - (c) Singer and Nicolson
 - (d) Robert brown
- (iv) Which of the following statements is not true for plasma membrane?
 - (a) It is present in both plant and animal cell.
 - (b) Lipid is present as a bilayer in it.
 - (c) Proteins are present integrated as well as loosely associated with the lipid bilayer.
 - (d) Carbohydrate is never found in it.

(v) **Direction:** In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: The plasma membrane is selectively permeable.

Reason: It allows solvents and solutes to pass through it.

Ans. (i) (d) All of the above.

Explanation: Glycosphingolipids, cholesterol glycoprotein lipid microdomains are together called as lipid rafts.

(ii) (d) All of the above.

Explanation: These are the mechanisms through which molecules can be moved across the membrane. Passive transport mechanism use no energy while active transport require energy to get it done.

(iii) (c) Singer and Nicolson

Explanation: According to fluid mosaic model the membrane is made up of lipid bilayer and integral and peripheral proteins in mosaic pattern. Lipids are of quasi fluid nature which enable protein movement and movement in bilayer protein.

(iv) (d) Carbohydrate is never found in it.

Explanation: Plasma membrane is of lipoprotein nature carbohydrate are never formed in it.

(v) (d) Both A and R are false.

Explanation: Membrane is selectively permeable. It allows solvent molecules to pass through it. It may be permeable to some selective molecules also.

Q. 3. Read the following to answer any four questions from (i) to (v) given below:

German botanist, Matthias Jacob Schleiden in 1838, observed different parts of the plants under the microscope and found that all of them are made up of cells. German zoologist, Theodor Schwann in 1839, observed parts of the animal body and noticed that cells had an outer layer which is also called as plasma membrane. Schleiden and Schwann together gave cell theory. This theory states that bodies of all living organisms are made up of cells and their products.

Rudolf Virchow studied that all cells arise from the pre-existing cells. In other words, the existing cells divide to form new cells. He stated this in Latin as "omnis cellula-e-cellula" and on this basis proposed the modern cell theory.

(i) One of the following contributed cell lineage to cell doctrine

- (a) Robert Hooke
- (b) Schleiden Schwann
- (c) Robert Virchow
- (d) All the above

(ii) Schleiden and Schwann were respectively

- (a) German Zoologist and French Botanist.
- (b) French Botanist & German zoologist.
- (c) Both German zoologist of Botanist.
- (d) Both German Botanist respectively.

(iii) One of the following is exception to cell theory

- (a) Bacteria
- (d) Fungi
- (c) Virus
- (d) Lichens

(iv) Idea of individuality of cell as well as the concept of the cell was

- (a) Robert Hooke
- (b) R. Virchow
- (c) Dutrochet
- (d) Schleiden

(v) **Direction:** In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Cell theory states that unit of life is cell.

Reason: Robert Hooke was the first to coin the term cell.

Ans. (i) (c) Robert Virchow

Explanation: R. Virchow suggest that cell come from preexisting cell to gave the cell doctrine in model cell theory.

(ii) (c) Both German zoologist and Botanist

Explanation: Schleiden, Botanist and Schwann, gave cell theory.

(iii) (c) Virus

Explanation: viruses are made up of nucleoprotein. They are exception to cell theory.

(iv) (c) Dutrochet

Explanation: He was the first to recognize the importance of an organisms individual cell. He gave the and cell theory for the first time.

(v) (b) Both A and R are true, but R is not the correct explanation of A.

Explanation: Robert Hooke was the first to discover the cell in 1665, he coined the term cell.

□□□

Objective Type Questions

(1 mark each)

ASSERTION-REASON TYPE QUESTIONS

Direction: In the following question, the Assertions (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

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 (c) A is true but R is false.
 (d) Both A and R are false.

Q. 1. Assertion: ATP is known as the energy currency of the cell.

Reason: ATP can pick up energy where it is being liberated and supply the same where it is being consumed.

Ans. Option (a) is correct.

Explanation: ATP is called energy currency of the cell. It can pick up energy where it is being liberated and supply the same where it is being consumed.

Q. 2. Assertion: Palmitic acid is an unsaturated fatty acid.

Reason: These are fatty acids with double bond.

Ans. Option (d) is correct.

Explanation: Palmitic acid is a saturated fatty acid. These are fatty acids without double bond.

Q. 3. Assertion: Haemoglobin has quaternary structure.

Reason: Haemoglobin has four chains, two α -chains and two β -chains.

Ans. Option (a) is correct.

Explanation: Large proteins such as haemoglobin have quaternary structure. It has four chains, two α -chains and two β -chains.

Q. 4. Assertion: Glutamate pyruvate transaminase is a transferase enzyme.

Reason: They transfer group from one molecule to another.

Ans. Option (a) is correct.

Explanation: Transferases transfer group from one molecule to another e.g., glutamate pyruvate transaminase.

Q. 5. Assertion: Increase in substrate concentration increases the rate of reaction.

Reason: Substrate molecules occupy one and more active sites.

Ans. Option (a) is correct.

Explanation: Increase in substrate concentration increases the rate of reaction. The enhanced rate is due to occupation of one and more active sites by the substrate molecules.

Q. 6. Assertion: In peroxidase, haemoglobin, myoglobin and catalase, haem is prosthetic group.

Reason: Prosthetic groups are non-protein organic factors which are firmly attached to the apoenzyme.

Ans. Option (a) is correct.

Explanation: Prosthetic groups are non-protein organic factors which are firmly attached to the apoenzyme. e.g. In peroxidase, haemoglobin, myoglobin and catalase, haem is prosthetic group.

Q. 7. Assertion: Nucleic acids exhibit secondary structure.

Reason: It is the linear sequence of amino acids in a polypeptide chain.

Ans. Option (c) is correct.

Explanation: It is a linear sequences of nucleotides in a polynucleotide chain. Primary structure of protein is the linear sequence of amino acids in a polypeptide chain reveals primary structure of protein.

Q. 8. Assertion: Lipids are not strictly macromolecules.

Reason: Lipids are indeed small molecular weight but because of their association with membranes separate in the macromolecular fraction.

Ans. Option (a) is correct.

Explanation: The molecular weights of macromolecules ranges to ten thousand Daltons and above. However, lipids, whose molecular weights do not exceed 800 Da, that comes under macromolecular fraction. Lipids are also arranged into structures like cell membrane and other membranes. On grinding, these membrane fragments in the form of vesicles get separated along with the acid insoluble pool and hence in the macromolecular fraction. Hence, lipids are not strictly macromolecules.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following passage to answer any four questions from (i) to (v) given below:

Proteins are polypeptide chains made up of amino acids. There are 20 types of amino acids joined together by peptide bond between amino and

carboxylic group. There are two kinds of amino acids, Essential amino acids and Non-essential amino acids. The Primary structure of protein is the linear sequence of amino acids in a polypeptide chain. The first amino acid of sequence is called

CHAPTER 9 - BIOMOLECULES

Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS

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Q. 2. Assertion: Palmitic acid is an unsaturated fatty acid.

Reason: These are fatty acids with double bond.

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Explanation: The molecular weights of macromolecules ranges to ten thousand Daltons and above. However, lipids, whose molecular weights do not exceed 800 Da, that comes under macromolecular fraction. Lipids are also arranged into structures like cell membrane and other membranes. On grinding, these membrane fragments in the form of vesicles get separated along with the acid insoluble pool and hence in the macromolecular fraction. Hence, lipids are not strictly macromolecules.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following passage to answer any four questions from (i) to (v) given below:

Proteins are polypeptide chains made up of amino acids. There are 20 types of amino acids joined together by peptide bond between amino and

carboxylic group. There are two kinds of amino acids, Essential amino acids and Non-essential amino acids. The Primary structure of protein is the linear sequence of amino acids in a polypeptide chain. The first amino acid of sequence is called

N-terminal amino acids and last amino acid of peptide chain is called C-terminal amino acids. The secondary structure proteins forms helix. There are three types of secondary structure: α helix, β pleated and collagen helix. In tertiary structure long protein chain is folded upon itself like a hollow woollen ball to give three-dimensional view of protein. In quaternary structure, each polypeptide develops its own tertiary structure and function as subunit of protein.

in their structure a single hydrogen atom as its side chain

(ii) (d) Zwitter ionic form.

Explanation: Under Certain condition an amino acid may have both positive and negative charges simultaneously in the same molecule. Such a form of amino acid is known as Twitter ionic form.

(iii) (a) Two ends

Explanation: Primary protein is simply amino acid sequence has two ends, the carboxyl amino terminals.

(iv) (d) All the above

Explanation: Tertiary Structure of protein is maintained by several types of bonds such as hydrogen bonds, ionic bonds, sulphide bonds and hydrophilic and hydrophobic bonds formed between are part of polypeptide and another.

(v) (d) Both A and R are false.

Explanation: Amino acids are monomers of protein and are not of nucleic acid. Proteins are built from a set of only 20 amino acid.

AI Q. 2. Read the following to answer any four questions from (i) to (v) given below:

The enzyme molecule operates by chemically binding with the substrate molecule, to form an enzyme-substrate complex. The enzyme's tertiary structure consists of a unique pocket or site on which the substrate molecules can become attached and interact subsequently. This brings about an interaction between the specific active sites in the enzyme molecule and the reactive sites in the substrate molecule. The enzyme now breaks down the substrate into- products. The products initially remain attached to the enzyme for a short while forming an enzyme product complex. The products get released from the enzyme molecule subsequently. The enzyme is now ready to receive another substrate molecule again. Thus, the same enzyme can be used again and again.

(i) Enzymes are biocatalysts. They catalyse biochemical reactions. In general they reduce activation energy of reactions. Many physico-chemical processes are enzyme mediated. Some examples of enzyme mediated reactions are given below. Identify the wrong entry.

- (a) Dissolving CO_2 in water
- (b) Untwining the two strands of DNA
- (c) Hydrolysis of sucrose
- (d) Formation of peptide bond

(ii) Which of the following is the best evidence for the lock and key theory of enzyme reaction:

- (a) All enzymes are proteins.
- (b) Compounds similar in structure to substrate inhibit the reaction.
- (c) Certain enzymes speed up certain reactions.
- (d) Direction of reaction is determine by enzyme.

(i) Amino acids, as the name suggests, have both an amino group and a carboxyl group in their structure. In addition, all naturally occurring amino acids (those which are found in proteins) are called L-amino acids. From this, can you guess from which compound can the simplest amino acid be made?

- (a) Formic acid
- (b) Methane
- (c) Phenol
- (d) Glycine

(ii) Many organic substances are negatively charged e.g., acetic acid, while others are positively charged e.g., ammonium ion. An amino acid under certain conditions would have both positive and negative charges simultaneously in the same molecule. Such a form of amino acid is called:

- (a) Positively charged form
- (b) Negatively charged form
- (c) Neutral form
- (d) Zwitter ionic form

(iii) A primary protein should normally have:

- (a) Two ends
- (b) One end
- (c) Three ends
- (d) No ends

(iv) The tertiary structure of a protein contains

- (a) Hydrogen bonds
- (b) Peptide bonds
- (c) Ionic bonds and S-linkage
- (d) All the above

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Amino acids are monomers of nucleic acid.

Reason: Protein amino acids have an unlimited variety.

Ans. (i) (d) Glycine

Explanation: It is the simplest amino acid which have both an amino group of a carboxyl group

(iii) Model of Emil Fisher implies that:

- (a) Active site of enzyme is flexible and adjust to the substrate.
- (b) An enzyme and a substrate unit at the active site thus forming the enzyme substrate complex.
- (c) The active site requires removal of PO_4 group.
- (d) Active site is complementary to that of substrate.

(iv) Khosland's model of enzyme action implies that:

- (a) Enzyme and substrate unit at the active site like lock and key fits a lock.
- (b) Inducible change is brought about at the active site of enzyme by substrate.
- (c) Active site of enzyme brings about the conformational change in the substrate.
- (d) None of the above

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Enzyme and substrate respectively have active and reactive sites on their surface.

Reason: Active and reactive sites push the enzyme and substrate molecules away from each other.

Ans. (i) (a) Dissolving CO_2 in water

Explanation: CO_2 easily gets dissolved in water, it is not catalysed by any enzyme, while unwinding of DNA strands hydrolysis and sucrose of peptide bond formation are catalysed by enzyme topoisomerase, sucrase and transferase respectively.

(ii) (b) Compounds similar in structure to substrate inhibit the reaction.

Explanation: The compound similar in structure to substrate block the active site of the enzyme. Therefore, the substrate fail to unite with the enzyme and thus the reaction is inhibited.

(iii) (d) Active site of enzyme brings about the conformational charge in the substrate

Explanation: Active site is complementary to that of substrate. The enzyme molecule interacts with only a specific type of substrate which unite with and fits in the enzyme like a key in the lock.

(iv) (b) Inducible change is brought about at the active site of enzyme by substrate.

Explanation: The substrate brings about the conformational change in the active site of enzyme thus forming suitable ES complex This is in accordance with the Khosland's induced fit model of enzyme action.

(v) (c) A is true but R is false.

Explanation: Active and reactive sites of enzyme and substrate do not push away each other but make them to unite to form the ES complex.

Q. 3. Read the following to answer any four questions from (i) to (v) given below:

Neutral or true fats are esters of fatty acid with glycerol. They are also called glycerol. A fat molecule consists of one molecule of glycerol and one to three molecules of the same or different long-chain fatty acids. Glycerol has 3 carbons each bearing a hydroxyl (OH) group. Whereas fatty acid molecule is an unbranched chain of carbon atoms having a carboxylic group attached to an R group. The R group could be a methyl ($-\text{CH}_3$) or ethyl ($-\text{C}_2\text{H}_5$) or higher number of $-\text{CH}_2$ groups (C_1 to 19-C). eg. Palmitic acid has 16-C. Saturated fatty acid are without double bonds whereas unsaturated fatty acid are with one or more double bonds. Neutral fats may be monoglycerides if there is only one molecule of fatty acid attached to a glycerol molecule. If the number of fatty acids attached is two then it is a diglyceride or triglyceride if it is three. Esters of fatty acid with high molecular weight alcohol are called waxes. Compound lipids are also esters but contain some other substances also. Steroids and prostaglandins are derived lipids.

(i) Paraffin wax is

- (a) Ester
- (b) Acid
- (c) Monohydric alcohol
- (d) Cholesterol

(ii) How many molecules of fatty acids may occur in a lipid molecule?

- (a) One
- (b) Two
- (c) Three
- (d) One to three

(iii) Lecithin is a

- (a) Glycolipid
- (b) Steroid
- (c) Phospholipid
- (d) Carbohydrate

(iv) Polyunsaturated fatty acid contain

- (a) Few double bounds
- (b) Single double bond
- (c) No double bond
- (d) Alternate double bond

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Polyunsaturates are considered good for health.

Reason: They help in reducing blood cholesterol level.

Ans. (i) (a) Ester

Explanation: Paraffin wax is the ester of fatty acid with long chain high molecular weight alcohol.

(ii) (d) One to three

Explanation: A fatty acid molecule may contain 1-3 fatty acid, They are called mono glycerides diglycerides and triglycerides are respectively, one, two, three fatty acids are attached to a glycerol molecules.

(iii) (c) Phospholipid

Explanation: Lecithin is a compound liquid. It is also an ester of fatty acid with alcohol but also contain other substances. Lecithin consists of glycerol, two fatty acids, a phosphate group and choline.

(iv) (a) Few double bonds

Explanation: They are fatty acids (PUFA) that contain more than one double bonds

(v) (a) Both A and R are true, and R is the correct explanation of A.

Explanation: Polyunsaturates are the oils containing polyunsaturated fatty acids. They help in reducing the risk of heart disease by lowering cholesterol levels in blood.

□□□

CHAPTER 1 - THE LIVING WORLD

? Objective Type Questions

(1 mark each)

ASSERTION- REASON TYPE QUESTIONS:

Direction: In the following question, the Assertion (A) and Reason (R) have been put forward.

Read both the statements and choose the correct option from the following.

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Q. 1. Assertion: Reproduction cannot be an all-inclusive defining characteristic of living organisms.

Reason: Some organisms exhibit characteristics of living things but they do not reproduce.

Ans. Option (a) is correct.

Explanation: Some organisms like mules, sterile worker bees, infertile human couples, etc., exhibit characteristics of living things but they do not reproduce. Therefore, reproduction cannot be an all inclusive defining characteristic of living organisms.

Q. 2. Assertion: Respiration is an anabolic process.

Reason: The biochemical reactions which are concerned with the synthesis of complex substances from simpler substances are collectively called anabolism.

Ans. Option (d) is correct.

Explanation: Respiration is a catabolic process. It is a biochemical reaction which is concerned with breakdown of complex organic substances into simpler substances.

AI Q. 3. Assertion: Systematics is the branch of biology that deals with identification, naming and classification of the organisms into groups.

Reason: The aim of classification is to group the organisms.

Ans. Option (b) is correct.

Explanation: Systematics is the branch of biology that deals with identification, naming and classification of the organisms into groups. The aim of classification is to group the organisms.

AI Q. 4. Assertion: The generic name begins with capital letter while specific name begins with small letter.

Reason: Scientifically mango is written as *Mangifera indica*.

Ans. Option (b) is correct.

Explanation: Scientifically mango is written as *Mangifera indica*. The generic name begins with capital letter while specific name begins with small letter.

Q. 5. Assertion: Taxon and category are same things.
Reason: Category shows hierarchical classification of an organism.

Ans. Option (d) is correct.

Explanation: Taxon and category are different things. A category is a rank or level in the hierarchical classification of organism while taxon is a unit in classification which may represent any level of grouping of organisms based in certain common characteristics.

AI Q. 6. Assertion: Herbaria and botanical gardens are taxonomic aids or tools.

Reason: They are used in the identifications of plants and animals.

Ans. Option (a) is correct.

Explanation: Tools or aids used in the identification of plants and animals are called as Taxonomic aids. Herbaria, zoological parks, zoos, manual, botanical gardens, keys, etc. are taxonomic aids.

Q. 7. Assertion: Living organisms possess specific individually with definite shape and size.

Reason: Both living and non living entities resemble each other at lower level of organization.

Ans. Option (c) is correct.

Explanation: Non living things do not have organization as seen in the living beings as:

Cell organelles → Cells → Tissue → Organs → Organ system → Individual organism.

In multicellular organism the cell represent the level of organization not seen in non livings.

AI Q. 8. Assertion: Growth is the final end product of successful metabolism.

Reason: Catabolic processes are more than the anabolic process in growth.

Ans. Option (c) is correct.

Explanation: Growth occurs when anabolism exceeds catabolism because the later is a destructive process and former is a synthetic process.

Q. 9. Assertion: Linnaeus is regarded as the father of taxonomy.

Reason: He gave a scheme of classification with a few exceptions still used.

Ans. Option (a) is correct.

Explanation: Linnaeus gave the sexual system of class and was the first who did the classification of plants on the basis of floral characters.

Q. 10. Assertion: Species are static units in classification.

Reason: Species do not change with time.

Ans. Option (d) is correct.

Explanation: Species are dynamic, everchanging and genetically distinct group of organisms.

Q. 11. Assertion: There is no difference between the terms Taxon and categories.

Reason: Aves is a taxon that includes category bird.

Ans. Option (d) is correct.

Explanation: A category is an abstract term which represent rank or level in classification while taxon represents real biological objects assigned to a category. e.g. Taxon is a bird is aves and their category is class.

Q. 12. Assertion: There are only seven categories in taxonomy.

Reason: Others are called intermediate categories.

Ans. Option (b) is correct.

Explanation: Intermediate or subcategories are generally added to the hierarchy of seven categories for finer distinction whenever necessary.

Q. 13. Assertion: Flora, manual and monograph are alternative taxonomic aids which help to correct identification of plants.

Reason: Monographs provide information for identification of species found in an area above.

Ans. Option (c) is correct.

Explanation: Monograph contains information about anyone taxon.

Q. 14. Assertion: Botanical gardens are specialized gardens.

Reason: They have collection of living and non-living plants of various groups.

Ans. Option (d) is correct.

Explanation: Botanical gardens have collection of plants only.

Visual Case-Based Questions

(4 marks each)

Q. 1. Read the following to answer any four questions from (i) to (v) given below:

Classification involves hierarchy of steps in which each step represents taxonomic category. Each taxonomic category is referred to as a unit of classification and is commonly termed as taxon.

Taxonomic hierarchy is a system of arranging all taxonomic categories in descending order with kingdom at the top and species at the base.

As we go up the taxonomical hierarchy, the number of individuals increases but the number of common characteristics goes on decreasing.

(i) As we go from species to kingdom in a taxonomic hierarchy, the number of common characteristics:

- (a) Will decrease
- (b) Will increase
- (c) Remain same
- (d) May increase or decrease

(ii) Which of the following 'suffixes' used for units of classification in plants indicates a taxonomic category of 'family'?

- (a) - Ales
- (b) - Onae
- (c) - Aceae
- (d) - Ae

(iii) The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchical level in classification of plants?

- (a) Class
- (b) Order

(c) Division

(d) Family

(iv) Genus represents:

- (a) An individual plant or animal.
- (b) A collection of plants or animals.
- (c) Group of closely related species of plants or animals.
- (d) None of the above

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: Taxonomic hierarchy is the unit of classification that arrange all the taxonomic categories.

Reason: Taxonomic hierarchy is arrangement of all taxonomic categories in descending order from kingdom to species.

Ans. (i) (a) Will decrease

(ii) (c) - Aceae

(iii) (c) Division

(iv) (c) Group of closely related species of plants or animals.

(v) (a) Both A and R are true, and R is the correct explanation of A.

Q. 2. Read the following to answer any four questions from (i) to (v) given below:

There are millions of living organisms on earth. All these living organisms differ in shape, size, colour, habitat and many other characteristics. To understand their origin, diversity, distribution and inter relationship, the scientists have devised mechanisms to classify all of them. Classification of living organisms help in revealing the relationship between various organisms. It also helps in making study of organisms easy and organized.

(i) A scientist who made significant contribution of field of classification is:

- (a) Pasteur
- (b) Darwin
- (c) Oparin
- (d) Linnaeus

(ii) Modern classification is based on:

- (a) Fossils
- (b) Phylogeny
- (c) Morphology
- (d) Phylogeny

(iii) An important criteria on in the present day classification is:

- (a) Morphological resemblance.
- (b) Breeding habit.
- (c) Anatomical & Physiological traits.
- (d) Presence / absence of notochord.

(iv) All living organism are linked to one another because:

- (a) They have common genetic material of the same type.
- (b) They share common genetic material bus to varying degrees.
- (c) They have common cellular organization
- (d) All of the above.

(v) Direction: In the following questions the Assertions (A) and Reasons (R) have been put forward. Read both the statements and choose the correct option from the following:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) Both A and R are false.

Assertion: The term systematics refers to the diversity of different kinds of organisms and their relationship.

Reason: Systematics deals with the identification, naming and classification of the organisms into groups.

Ans. (i) (d) Linnaeus

(ii) (d) Phylogeny

(iii) (c) Anatomical & Physiological traits

(iv) (b) Group of closely related species of plants or animals

(v) (a) Both A and R are true, and R is the correct explanation of A.

□□□