Q1) How is the diffusion of gases in water important for aquatic animals?

Solution:

Gases such as oxygen and carbon dioxide present in the atmosphere dissolve in water. These gases are essential for the survival of aquatic animals. Aquatic animals utilize this dissolved oxygen for respiration.

Q2) The momentum of a moving car is 72,000 kgm/s. It takes 32 minutes to bring it to rest after application of its brakes. How much is the force exerted by the brakes to stop the car?

Solution:

Given that:

Initial momentum = 72,000 kgm/s

Final momentum = 0 kgm/s

Time taken = 32 min = 180 s

The force applied by the brakes is 400 N.

Q3) What is the speciality of the cellular structure of viruses?

Solution:

Viruses do not have plasma membrane, cytoplasm, or other cell organelles. They just have their genetic material surrounded by a protein coat. Due to the lack of cellular apparatus, they require the host's cell to reproduce.

Q4) If some alcohol is rubbed on the hand, the rubbed portion of the hand feels cool. Why?

Solution:

Alcohol is a volatile liquid. It evaporates at room temperature. When it is rubbed on the hand, it draws heat from the skin and evaporates into the surroundings. As a result, the rubbed portion of the hand feels cool.

Q5) The movement of materials in xylem is unidirectional while it is bidirectional in phloem. Comment on the statement.

Solution:

Xylem is involved in the conduction of water and minerals from roots to the different parts of the plant. This movement is always unidirectional. On the other hand, phloem transports food materials from leaves

to the different parts of the plant as well as from the storage organs to the site where the food is required. This movement is, therefore, bidirectional.

Q6) It is easier to cut vegetables with a sharp knife than a blunt knife.

Solution:

A sharp knife has lesser area of contact than a blunt knife to exert pressure.

Since pressure = *F*/*A*, where *F* is the force and *A* is the area of contact

Lesser is the area, more would be the pressure. Hence, it is easier to cut vegetables with a sharp knife than a blunt knife

Q7) What do you understand by capture fishing and culture fishing? Give any two examples of marine fishes.

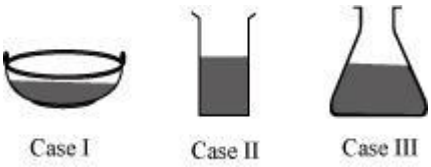
Solution:

Capture fishing is the process of obtaining fishes from natural resources. On the other hand culture fishing is the practice of farming fishes in both fresh water ecosystem and in marine ecosystem.

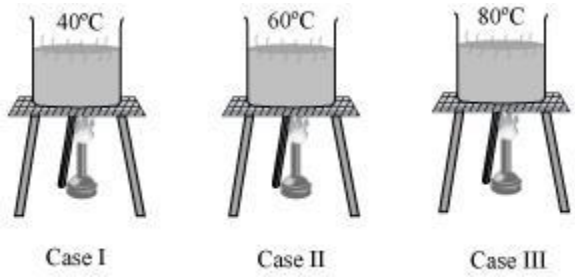
Examples of marine fishes: pomphret and sardines

Q8) (a). In which of the following cases will the rate of evaporation be fastest?

i.



ii.



(b). When cold water is poured in a glass, small droplets get condensed on the surface of the glass. Why?

Solution:

(a).

i. **Case I**

The rate of evaporation increases as the surface area increases.

ii. **Case III**

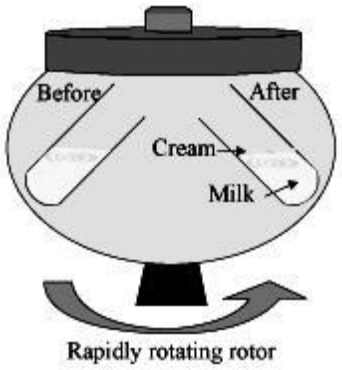
Rate of evaporation is directly proportional to temperature. As temperature is maximum in case III, the rate of evaporation will also be maximum in this case.

(b). We know that air contains water vapour. When cold water is poured into a glass, the surface of the glass becomes cool. The water vapours present in the air come into contact with the surface, lose energy and get condensed into small droplets of water.

Q9) How can cream be separated from milk?

Solution:

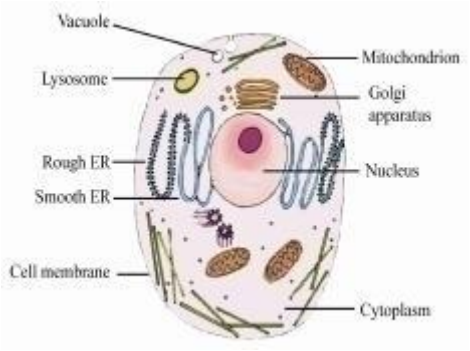
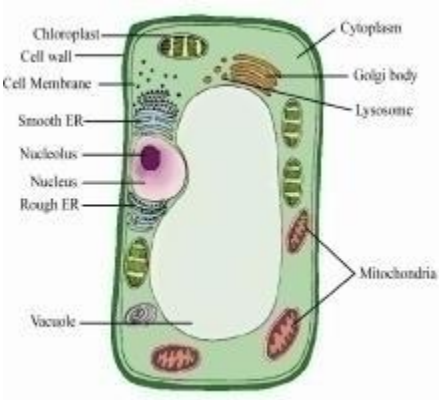
Cream can be separated from milk by the process of centrifugation. This process utilises the centrifugal force generated by a spinning motor to separate the molecules by size or density. During this process, the denser particles are forced to the bottom, while the lighter particles come on top. Cream collects in the upper layer of milk after centrifugation. This is because fat (cream) is the lightest component of milk.



Q10) Differentiate between plant and animal cells with the help of diagram.

Solution:

-	Animal cells	-	Plant cells
(i)	Animal cells are generally smaller in size.	(i)	Plant cells are usually larger than animal cells.
(ii)	Cell wall is absent.	(ii)	Cell wall surrounds the plasma membrane.

(iii)	Plastids are not present in animal cells.	(iii)	Plastids are present in plant cells.
(iv)	Vacuoles in animal cells are smaller in size.	(iv)	Vacuoles are larger in size. A large central vacuole is present.
			

Q11) Write a brief account on the biotic factors that affect the storage of crop plants.

Solution:

Some of the biotic factors that affect the storage of crop plants are listed as follows:

- Weeds − They are the plants that grow in cultivated fields along with the crop plant. They compete with the crop plant for nutrients, light, and space. As a result, the crop plant gets lesser of these essential requirements, thereby showing a decline in their productivity. *Xanthium, Parthenium*, etc. are some examples of weeds.
- Pests − They are generally insects. They destroy crops by sucking the cellular sap from various plant parts, cutting the roots, stem, and leaves of plants, and boring into stems and fruits.
- Microorganisms or pathogens − They are the diseases-causing agents in crop plants. Pathogens can be bacteria, fungi, or virus. These pathogens are generally transmitted through soil, water, and air.

Q12) Differentiate between organic manure and chemical fertilizer.

Solution:

Difference between organic manure and chemical fertilizer:

S.No.	Organic manure	Chemical fertilizer
(i)	A natural substance prepared by the decomposition of plant and animal materials	A natural substance prepared by the decomposition of plant and animal waste

(ii)	Increases the humus content of the soil	Does not increase the humus content of the soil.
(iii)	Does not cause any pollution but helps in recycling the waste	Their excessive use causes pollution
(iv)	Prepared in fields	Manufactured in factories
(v)	Rich in plant nutrients, such as nitrogen, phosphorus and potassium	They have a relatively poor content of plant nutrients
(vi)	E.g., sodium nitrate, urea	E.g., cow dung, plant waste

Q13) A ball is dropped from a height of 5 m. If its velocity increases uniformly at the rate of 10 m/s^2, then with what velocity will it strike the ground? After what time will it reach the ground?

Solution:

Given that,

Initial velocity, $u = 0$

Distance, $s = 5$ m

Acceleration, $a = 10\ m/s^2$

From third equation of motion,

$v^2 - u^2 = 2as$ [Where, v is the final velocity]

$v^2 - 0 = 2 \times 10 \times 5$

$v^2 = 100$

$v = 10$ m/s

From first equation of motion,

$v = u + at$

$10 = 0 + 10 \times t$

$t = 1$ s

The ball will strike the ground with a velocity of 10 m/s after 1 s.

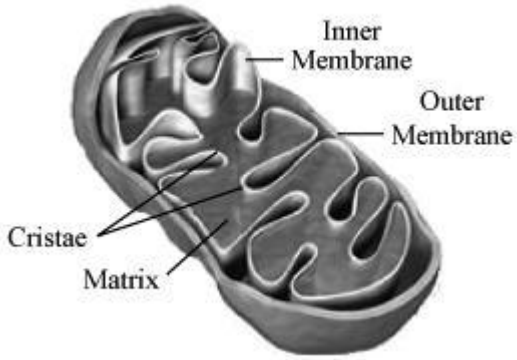
Q14) Explain the structure of the cell organelle known as the powerhouse of cell with the help of a neat labelled diagram.

Solution:

Mitochondria are responsible for the production of most of the energy (ATP) in cells. Therefore, mitochondria are also known as the **powerhouse** of cells.

Mitochondrion is a membrane-enclosed organelle found in eukaryotic cells.

A mitochondrion is composed of two lipid membranes, enclosing the matrix. The inner membrane gets folded to form numerous **cristae.** Cristae are the main site for ATP production. Mitochondrial matrix contains mitochondrial DNA and ribosomes.



Q15)*Differentiate between the following.*

(i) Gas and vapour

(ii) Homogenous and heterogeneous materials

(iii) Boiling and condensation

Solution:

(i) A gas is a substance, which exists in gaseous state such that its temperature is equal to or more than the boiling point of its liquid state. On the other hand, vapour is a substance, which exists in gaseous state such that its temperature is lower than the boiling point of its liquid state.

(ii) Homogeneous materials have same composition and properties throughout.

On the other hand, heterogeneous materials have different compositions and properties in different parts.

(iii) Boiling is the process by which liquid state changes into gaseous state by absorption of heat energy. On the other hand, in the process of condensation, a gas changes to liquid by evolution of heat energy.