







explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

### Section B

21. The weight of a person on a planet A is about half of that on the Earth. He can jump up to 0.4 m high on the Earth. How high can he jump on planet A? [2]

OR

The speed of a vehicle of mass 500 kg increases from 36 km/h to 72 km/h. Calculate the increase in its kinetic energy.

22. What is evaporation? What are the factors affecting it? [2]  
23. What do you understand by loud and soft sound? [2]  
24. What is happen when solid ammonium chloride is heated? [2]  
25. An automobile vehicle has a mass of 1500 kg. What must be the force between the vehicle and road if the vehicle is to be stopped with a negative acceleration of  $1.7 \text{ ms}^{-2}$ ? [2]

OR

A bullet of mass 5 g travelling at a speed of  $120 \text{ ms}^{-1}$  penetrates deeply into the fixed target and is brought to rest in 0.01 s. Calculate: (a) the distance of penetration in the target, (b) the average force exerted on the bullet.

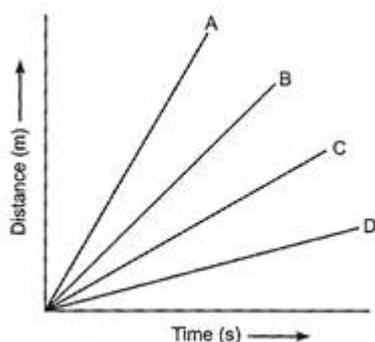
26. What is the difference between cathode rays and canal rays. Why are canal rays called so? [2]

### Section C

27. i. On which factors the speed of sound depends? [3]  
ii. How bat searches its prey at night?  
28. Rutherford's atomic model was a reasonably good model of structure of atom based on the famous particle scattering experiment. However, it was subsequently modified by Neils Bohr and later on, by others. The resulting improvements in the understanding of atomic structure have greatly contributed to further scientific advancement. There are many other similar examples in scientific field when original contributors happily accept modifications in their ideas.

Answer the following questions based on the above information:

- i. Name the scientific values associated with above anecdotes.  
ii. Give any example from your life experiences so far which reflects display of such a value by you as an individual.  
iii. In what way such a personal attribute is likely to help you?  
29. Four cars A, B, C and D are moving on a leveled road. Their distance versus time graphs are shown in figure. [3]  
Which car is the slowest.

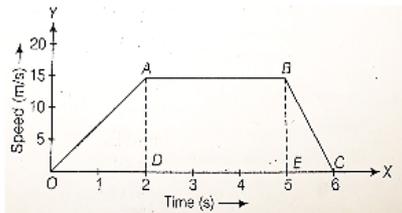


OR

Write a short note on uniform circular motion.

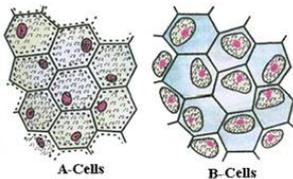
30. Shyam and his friends were playing with a catapult (gule) in his garden. Several mangoes were dislodged and fell with the help of catapult. One of his friend was aiming the catapult on a bird. Shyam prevented him from doing so. [3]
- Name the energy possessed by the stretched string of the catapult.
  - What will happen if the stone is thrown without stretching the string of a catapult?
  - Why did Shyam prevent his friend from aiming at the bird? Which quality is highlighted in Shyam's behaviour?

31. The speed-time graph of a car is given. The car weighs 1000 kg. [3]
- What is the distance travelled by car in the first 2s?
  - What is the braking force applied at the end of 5 s to bring the car to stop within one second?



32. Distinguish between Plant cell and Animal cells. [3]

OR



- Identify A and B cells.
  - What will happen if B cells are kept in hypotonic solution?
  - What will happen if A cells are kept in hypertonic solution?
33. What is a permanent tissue? Classify permanent tissues and describe them. [3]

#### Section D

34. What is the magnitude of the gravitational force between the earth and a 1 kg object on its surface? (Mass of the earth is  $6 \times 10^{24}$  kg and radius of the earth is  $6.4 \times 10^6$  m). [5]

OR

A stone is dropped from a 100 m high tower. How long does it take to fall?

- the first 50 m and
  - the second 50 m.
35. Grass looks green, papaya appears yellow. Which cell organelle is responsible for this? [5]

OR

Draw a plant cell and label the parts which

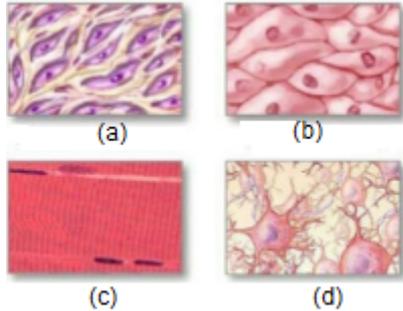
- determines the function and development of the cell
  - packages materials coming from the endoplasmic reticulum
  - provides resistance to microbes to withstand hypotonic external media without bursting
  - is site for many biochemical reactions necessary to sustain life.
  - is a fluid contained inside the nucleus
36. [5]
- What factors affect the solubility of solvent and solute?
  - State the differences between compounds and mixtures

Section E

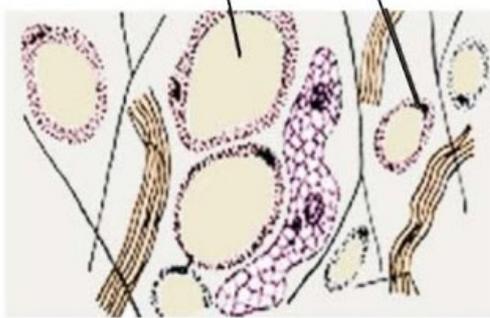
37. Read the following text carefully and answer the questions that follow:

[4]

Animal tissues are of many types such as epithelial tissue, connective tissue, muscular tissue and nervous tissue. Blood is a type of connective tissue, and muscle forms muscular tissue. The nature of the matrix differs in concordance with the function of the particular connective tissue. Blood has a fluid (liquid) matrix called plasma, in which red blood corpuscles, white blood corpuscles and platelets are suspended. Blood flows and transports gases, digested food, hormones and waste materials to different parts of the body. Bone is another example of connective tissue. It forms the framework that supports the body. It also anchors the muscles and supports the main organs of the body. Another type of connective tissue, cartilage, has widely spaced cells.



i. Identify the following tissue. (1)



ii. Are the cells of connective tissues loosely spaced? (1)

iii. What are the components of the matrix of bone? (2)

**OR**

Where is cartilage found in the human body? (2)

38. Read the following text carefully and answer the questions that follow:

[4]

Culture fishery is rearing and harvesting of fish in small water bodies. The best method of culture fishery is composite fish culture, Here, fishes are selected on the basis of their growth rate, palatability, area of feeding and tolerance towards others. All of them have their exclusive zone and type of feeding. There are three zones- surface, middle zone and bottom. Each zone can have 2 or even 3 feeding options.

You have studied the various fishes that can be accommodated in different zones of pond culture.

i. How many fishes can be accommodated at the bottom zone? (1)

ii. What types of fish can occur on the surface zone of fresh water fish ponds? (1)

iii. Where is fish Catla found in a fresh water culture pond? (2)

**OR**

Which fish feeds on filamentous algae and decaying vegetation? (2)

39. Read the following text carefully and answer the questions that follow:

[4]

Homogeneous mixtures are regarded as solutions or true solutions. Heterogeneous mixtures are of two types. These are suspensions and colloidal solutions. These differ in the size of the particles responsible for the

difference in their properties. In a suspension, the particle size is more than  $10^{-5}$  cm whereas in a colloidal solution, it ranges between  $10^{-5}$  cm to  $10^{-7}$  cm. The two phases which constitute colloidal solutions, are dispersed phase and dispersion medium. Based upon their nature, the colloidal solutions are classified into eight types. The mixture of the non-reacting gases is always homogeneous irrespective of their nature. Therefore, it is not a colloidal solution.

- i. Scattering of light occurs when a beam of light is passed through Blood. Why? (1)
- ii. What is Tyndall effect? (1)
- iii. What is called colloidal solution? (2)

**OR**

Give an example of colloidal solution and identified their dispersed phase and dispersion medium? (2)

# Solution

## Section A

1. **(d) III**  
**Explanation:** The rate of evaporation increases with an increase in surface area because evaporation is a surface phenomenon. Also, with the increase in air speed, the particles of water vapour will move away with air, which will increase the rate of evaporation.
2. **(c) Rough endoplasmic reticulum**  
**Explanation:** The proteins and lipids, essential for building the cell membrane, are synthesized by the rough endoplasmic reticulum (RER). The ribosomes attached to the RER help in this process.
3. **(d) distance travelled**  
**Explanation:** The area under a velocity-time graph represents the distance covered and the gradient of a velocity-time graph represents the acceleration.
4. **(c) Common carp - Surface feeder**  
**Explanation:** Common carp is a bottom feeder, as it is detritivorous/omnivorous.
5. **(a) tendon**  
**Explanation:** The bone is a connective tissue with a hard matrix, composed of calcium and phosphorus. A bone is connected by muscle with connective tissue, called a tendon.
6. **(d) Rudolf Virchow**  
**Explanation:** This statement was proposed by Rudolf Virchow in 1855. This theory is called Virchow's theory or Cell lineage theory. This the theory made as a result of objection to the Cell theory.
7. **(d) 22.0 g**  
**Explanation:** The molecular mass of CO<sub>2</sub> is 44 (12 + 26 × 2).  
6.022 × 10<sup>23</sup> molecules of carbon will contain 44 g.  
Hence, 3.011 × 10<sup>23</sup> molecules of CO<sub>2</sub> will contain a mass of 22 g.
8. **(b) remain at the same position**  
**Explanation:** When a nail is inserted in the trunk of a tree at a height of 1 metre from the ground, even after 3 year the nail remains at same level. It does not moves upwards as the apical meristem responsible for growth (length) is present in the apices only and lateral meristem responsible of increase in girth will lead to no change in length.
9. **(c) 2 g/cm<sup>3</sup>**  
**Explanation:**  $Density = \frac{mass}{volume} = \frac{8}{9-5} = \frac{8}{4} = 2 \text{ g/cm}^3$
10. **(a) acceleration**  
**Explanation:** We can find out the value of acceleration from the slope of the velocity-time graph of a moving body.  
Acceleration =  $\frac{\text{Change in velocity}}{\text{time}}$  = Slope of the velocity-time graph provided.
11. **(b) 0**  
**Explanation:** Helium (He) has two electrons in its atom. The cation (He<sup>2+</sup>) is formed through the loss of 2 electrons from the outer-most shell of the atom. Hence, the number of electrons in He<sup>2+</sup> will be 0.

12. **(d)** stratified squamous epithelium  
**Explanation:** A nonkeratinizing stratified squamous epithelium is found at three prominent sites in the animal body:  
 i. lining the esophagus,  
 ii. lining the sides and floor of the oral cavity, and  
 iii. lining the vagina.
13. **(c)** Its cell wall resists bursting  
**Explanation:** Cell wall exerts a pressure on the cytoplasm in the opposite direction. It prevents bursting of the cell in a hypotonic solution and limits endosmosis to a certain extent.
14. **(b)** a change of colour to blue-black in both tubes 'A' and 'B'  
**Explanation:** Iodine + Starch Solution → Blue-black colour  
 Starch act as an indicator of the presence of iodine.
15. **(c)** Muddy water  
**Explanation:** Muddy water will settle down because particles are heavy and settle due to gravity. Setting down of coarse particles under the influence of gravity is called sedimentation. During sedimentation, heavier particles settle down faster than finer particles.
16. **(b)** Holstein  
**Explanation:** Holstein Friesians is a breed of dairy cattle originating from the Dutch provinces of North Holland and Friesland, and Schleswig-Holstein in Northern Germany and Jutland. They are known as the world's highest-production dairy animals. On an average Holstein Friesian (HF) cow gives 10,000-12,000 litres of milk in a 10-month lactation cycle, whereas the yields from a desi cow are only 3,000-3,600 litres.
17. **(b)** Both A and R are true but R is not the correct explanation of A.  
**Explanation:** Both A and R are true but R is not the correct explanation of A.
18. **(c)** A is true but R is false.  
**Explanation:** Since the inter-particle spaces in the gaseous state are very large, they can be decreased by applying pressure. Thus, a gas can be easily compressed by applying pressure.
19. **(b)** Both A and R are true but R is not the correct explanation of A.  
**Explanation:** When the potted plant is covered by a glass jar water vapour appears on the jar because of transpiration due to which water is released from the plant in the form of water vapour which appears on the glass jar.
20. **(c)** A is true but R is false.  
**Explanation:** Sum of protons and neutrons is known as mass number which is same for isobars.

### Section B

21. Let, Potential energy of a person on Earth =  $mg_1h_1$

Potential energy of same person on planet 'A' =  $mg_2h_2$

Since, The potential energy of the person will remain the same on the Earth and on planet A.

Therefore,  $mg_1h_1 = mg_2h_2$

Since mass remains same, So, if  $g_1 = g$ , then  $g_2 = \frac{1}{2}g$

Here,  $h_1 = 0.4$  ; Now  $h_2 = \frac{g_1h_1}{g_2} = \frac{g \times 0.4}{\frac{g}{2}}$

or  $h_2 = 0.4 \times 2 = 0.8$  m.

Therefore, he can jump on planet A = 0.8m

OR

Given mass,  $m = 500 \text{ kg}$

The given unit of speed is km/h. It is to be converted into m/s.

$$\begin{aligned} &= 1 \text{ km/h} \\ &= \frac{1 \times 1000 \text{ metre}}{3600 \text{ second}} \\ &= \frac{5}{18} \text{ m/s} \end{aligned}$$

Initial speed,  $u = 36 \text{ km/h}$

$$\begin{aligned} &= 36 \times \frac{5}{18} \text{ m/s} \\ &= 10 \text{ m/s} \end{aligned}$$

Final speed =  $v = 72 \text{ km/h}$

$$\begin{aligned} &= 72 \times \frac{5}{18} \text{ m/s} \\ &= 20 \text{ m/s} \end{aligned}$$

Gain in KE = Final KE - Initial KE

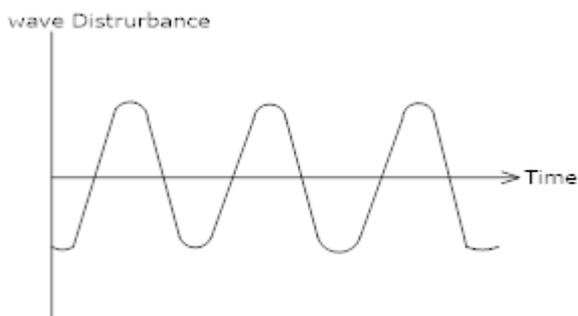
$$\begin{aligned} &= \frac{1}{2}mv^2 - \frac{1}{2}mu^2 \\ &= \frac{1}{2}m \times (v^2 - u^2) \\ &= \frac{1}{2} \times 500 \times [(20)^2 - (10)^2] \\ &= \frac{1}{2} \times 500 \times [400 - 100] \\ &= \frac{1}{2} \times 500 \times 300 \\ &= 75000 \text{ joule} \\ &= 7.5 \times 10^4 \text{ J} \end{aligned}$$

22. Evaporation is the process by which water (liquid) changes to vapours (gaseous form) at any temperature below its boiling point.

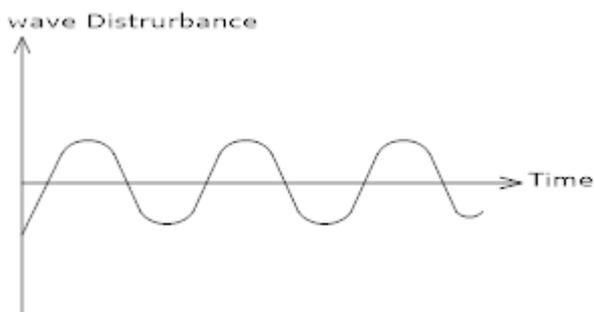
Factors on which evaporation depends:-

- (a) Surface area
- (b) Humidity
- (c) Wind speed
- (d) Temperature

23. Louder sound: - Sound which has a higher amplitude and high energy are called louder sound.



Softer sound: - Sound which has lesser amplitude and less energy are called soft sound.



24. It will directly change to the vapour state without passing through the liquid state. The process is known as sublimation.

25. Here,

Mass of the automobile,  $m = 1,500 \text{ kg}$

Negative acceleration,  $a = -1.7 \text{ ms}^{-2}$

Force needed to stop the vehicle,  $F = ?$

Using the relation,  $F = ma$

$$= 1500 \text{ kg} \times (-1.7 \text{ ms}^{-2}) = -2,550 \text{ kg ms}^{-2} = -2550 \text{ N}$$

The negative value of the force indicates that it is acting in the direction opposite to the direction of motion. So, the retarding force needed to stop the vehicle is 2550 N.

OR

$$m = 5 \text{ g} = 5 \times 10^{-3} \text{ kg}, u = 120 \text{ ms}^{-1}, v = 0, t = 0.01 \text{ s}$$

a. From the relation  $v = u + at$

$$\text{We have } 0 = 120 + a \times 0.01$$

$$\text{or } a = -\frac{120}{0.01} = -12000 \text{ ms}^{-2} \text{ (the negative sign here shows retardation)}$$

Distance of penetration in the target

$$S = ut + \frac{1}{2} at^2 \text{ we have}$$

$$S = 120 \times 0.01 + \frac{1}{2} \times (-12000) \times (0.01)^2 = 0.6 \text{ m}$$

b. Average retarding force  $F = ma = (5 \times 10^{-3}) \times (12000) = 60 \text{ N}$

Sr.-No.	cathod rays	canal rays
1.	Cathode rays are those which contain negative ions and are negatively charged. These negative ions are called electrons.	Canal rays or positive rays are those which contain positive ions and are positively charged. These positive ions are called protons.
2.	For cathode rays, the value of $e/m$ ratio of constituent particles does not depend upon nature of gas in the discharge tube.	$e/m$ ratio of constituent particles depend upon nature of gas.
3.	But magnitude of charge in cathode rays is always -1.	Magnitude of charge in canal rays is +1, but also +2, +3, ....

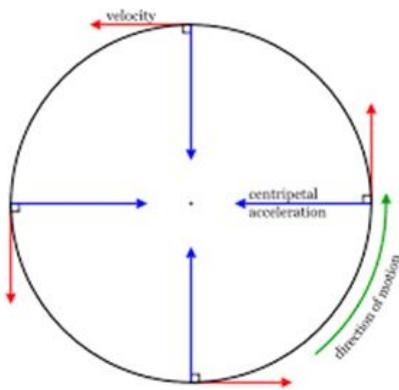
Canal rays are also known as cathode rays because all the rays move towards the positive side which known as anode and it is because of this it is also known as anode rays

### Section C

27. i. The speed of sound tells us the rate at which the sound travels from the sound-producing body to our ears. The speed of sound depends on a number of factors. These are given below:
- The speed of sound depends on the nature of the material through which it travels.
  - The speed of sound depends on the temperature.
  - The speed of sound depends on the humidity of the air.
- ii. Bats search their prey at night by the method of echolocation. They emit high-frequency ultrasonic squeaks while flying and listen to the echoes produced by the reflection of their squeaks from the prey like a flying object. From the time taken by the echo to be heard, bats can judge the distance of the insect and hence catch it.
28. i. Scientific values associated with above anecdotes are intellectual honesty, open-mindedness, and ability to accept failure for the benefit of the common good.
- Mention any example(s) - say your perception about culture and traditions / your incorrect understanding of a physical phenomenon - and subsequent change in belief.
  - Such a personal attribute helps in the improvement of the cognitive/thought processes, and leads to a better learning.
29. Speed = Slope of distance - time graph. The smaller the slope, the smaller is the speed.

OR

When a body moves in a circle, it is called circular motion. When the velocity of an object changes, we say that the object is accelerating. The change in the velocity could be due to change in its magnitude or the direction of the motion or both.



If the athlete is running along a hexagonal shaped path ABCDEF, the athlete will have to change his direction six times while he completes one round. If the athlete moves with a velocity of constant magnitude along the circular path, the only change in his velocity is due to the change in the direction of motion.

The motion of the athlete moving along a circular path is an example of an accelerated motion.

The circumference of a circle of radius  $r$  is given by  $2\pi r$ . If the athlete takes  $t$  seconds to go once around the circular path of radius  $r$ , the velocity  $v$  is given by

$$v = \frac{2\pi r}{t}$$

When an object moves in a circular path with uniform speed, its motion is called uniform circular motion.

30. a. Potential energy.  
 b. If the stone is thrown without stretching the string of catapult the stone will fall down. As the stretched catapult possess potential energy due to stretch. It throws the stone with the high speed as string is released.  
 c. Shyam prevents his friend from aiming at the bird because stone could harm the bird and he does not want to harm or kill the bird, this shows his care and love for the living beings.

31. i. Distance travelled by car in first 2 s = Area of  $\Delta OAD = \frac{1}{2} \times 2 \times 15 = 15 \text{ m}$

ii. Braking force,  $F = m \times a$

Given, mass of the car,  $m = 1000 \text{ kg}$ , initial velocity,  $u = 15 \text{ m/s}$ , final velocity,  $v = 0$ , time,  $t = 1 \text{ s}$

On applying,  $a = \frac{v-u}{t} \Rightarrow a = \frac{0-15}{1} = -15 \text{ m/s}^2$

$\therefore F = m a = 1000 \times (-15) = -15000 \text{ N}$

Sr. No.	Plant Cell	Animal Cell
1.	Cell wall is present.	Cell wall is absent.
2.	Plastids are present.	Plastids are absent.
3.	Plant cell are larger in size.	Animal cell are smaller in size.
4.	Plant cells cannot change shape.	Animal cells can change their shape.
5.	Nucleus lies on one side in the peripheral cytoplasm.	Nucleus usually lies in the centre.
6.	Food is stored in the form of starch .	Food is stored in the form of glycogen .
7.	Produce own food through photosynthesis.	Cannot photosynthesize.

OR

- a. A Cells- Turgid cells. B Cells- Plasmolysed cells.  
 b. If a B cell is placed in a hypertonic solution, the plant cell loses water and hence turgor pressure by plasmolysis: pressure decreases to the point where the protoplasm of the cell peels away from the cell wall, leaving gaps between the cell wall and the membrane and making the plant cell shrink and crumple.  
 c. When a fully turgid plant cell is placed in a hypertonic solution, water moves out, first from cytoplasm and then from vacuole. Cell membrane shrinks away from the cell wall. This phenomenon is known as plasmolysis.
33. Permanent tissues are derived from meristematic tissue but their cells have lost the power of division and have attained their definite form.

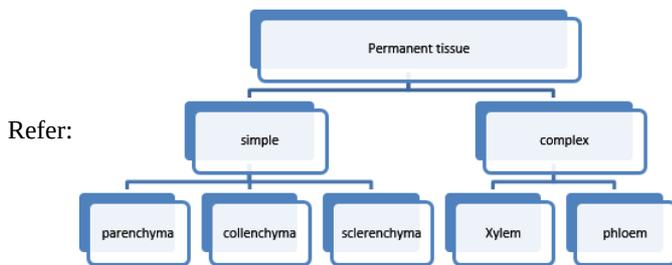
Permanent tissues are classified into - Simple permanent tissue and Complex permanent tissue.

- i. Simple permanent tissues: These tissues are composed of cells which are structurally and functionally similar. Simple permanent tissues are further classified into the following three types:-
  - a. Parenchyma: Parenchyma forms the bulk of the plant body. Parenchyma cells are living and possess the power of division.
  - b. Collenchyma: Collenchyma tissue is also living. It is characterised by the deposition of extra cellulose at the corners of the cells.
  - c. Sclerenchyma: Sclerenchyma cells are dead cells and they are devoid of protoplasm. The cell walls of sclerenchyma are largely thickened due to deposits of lignin.
- ii. Complex permanent tissues: The complex tissues consist of more than one type of cells having a common origin. All these cells coordinate to perform a common function.

Complex permanent tissues are of the following two types:-

- a. Xylem: Xylem is a vascular and mechanical tissue. It is a conducting tissue. Xylem is composed of four different types of cells: (i)Tracheids (ii) Vessels (iii) Xylem parenchyma (iv) Xylem sclerenchyma. Except xylem parenchyma, all other xylem elements are dead and bounded by thick lignified walls.
- b. Phloem: Like xylem, phloem is vascular but has no mechanical function. Phloem is composed of following four elements: (i) Sieve tubes (ii) Companion cells (iii) Phloem parenchyma (iv) Phloem fibres. Except phloem fibres, all other phloem elements are living.

Xylem and phloem are both conducting tissues and also known as vascular tissues; together, both of them constitute the vascular bundle.



#### Section D

34.  $F_{\text{gravitation}} = \frac{G \times M_e \times m_o}{r^2}$

$$\begin{aligned}
 &= \frac{6.67 \times 10^{-11} \times 6 \times 10^{24} \times 1}{(6.4 \times 10^6)^2} \\
 &= \frac{6.67 \times 6 \times 10^{-11+24}}{6.4 \times 6.4 \times 10^{12}} \\
 &= \frac{6.67 \times 6}{6.4 \times 6.4} \times 10^{-11+24-12} \\
 &= 0.9770 \times 10N = 9.770N
 \end{aligned}$$

OR

Initial velocity ,u=0

Total height, h = 100 m

- a. Let, for the first 50 m the time taken by the stone be 't' sec.

S=-50 m (- ve sign shows the stone falls in downward direction)

$$g = -10 \text{ m/s}^2$$

$$h = s = ut + \frac{1}{2}gt_1^2$$

$$\implies -50 = 0 + \frac{1}{2}(-10)t_1^2$$

$$\implies -50 = -5t_1^2$$

$$\implies \frac{50}{5} = t_1^2$$

$$\implies t_1^2 = 10$$

$$\implies t_1 = \sqrt{10}$$

$$\therefore t_1 = 3.16 \text{ sec}$$

- b. For the entire journey,let the time taken be T

$$u = 0$$

$$S = -100 \text{ m}$$

$$a = -10 \text{ m/s}^2$$

$$S = ut + \frac{1}{2}aT^2$$

$$\Rightarrow -100 = 0 + \frac{1}{2} \times (-10) T^2$$

$$\Rightarrow T_2 = 20$$

$$\Rightarrow T = \sqrt{20}$$

$$\Rightarrow T = 4.47 \text{ sec}$$

$$\therefore \text{Time taken to fall through the next 50 m} = T - t_1 = 4.47 - 3.16 = 1.31 \text{ sec}$$

35. Plastids are responsible. These are found in plant cells only. Plastids are the major cell organelles in plants. On the basis of pigments present in plastids, they are divided into two types;

- i. the colourless leucoplasts and
- ii. the pigmented chromoplasts.

The colourless leucoplasts store starch, oil and protein granules whereas the pigmented chromoplasts have different colours and can be of several types. The most important ones are those containing the pigment chlorophyll, known as chloroplasts, which is responsible for the preparation of food by photosynthesis. Other chromoplasts contain non-green pigments, which are responsible for the characteristic colours of fruits and flowers.

OR

- i. Nucleus
- ii. Golgi apparatus
- iii. Cell wall
- iv. Cytoplasm
- v. Nucleoplasm.

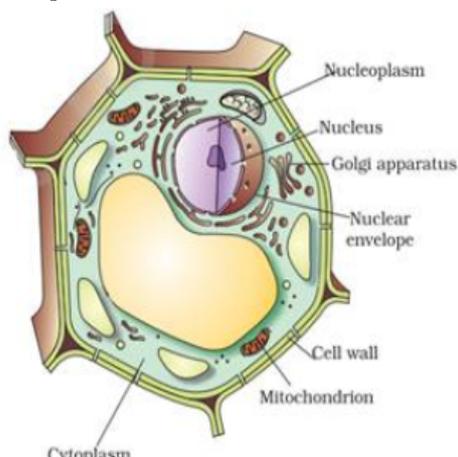


Figure: A plant cell

36. i. a. **Temperature:** For the majority of solutions of solid-in-liquid and liquid-in-liquid types, solubility increases with temperature. However, for solutions of gases-in-water type, solubility decreases with increase in temperature.
- b. **Pressure:** It is applicable to gas-in-liquid solutions. An increase in pressure increases the solubility of a gas. For example, aerated drinks contain carbon dioxide gas under pressure.
- c. **Mechanical Stirring:** Mechanical stirring increases solubility. For example, sugar dissolves faster on stirring with a spoon.
- d. **Size of Solute Particles:** Smaller the particle size of solute, greater is the solubility. For example, it is easier to dissolve powdered sugar than granules of sugar.
- ii. **Compounds**
- a. Compounds are pure substances.
  - b. They are made up of two or more elements combined chemically.
  - c. The constituents of a compound are present in a fixed ratio.
  - d. Compounds have fixed properties. For example, a particular compound will have fixed temperatures at which it melts and boils.
  - e. A compound can have properties different from its constituents, as a new substance is formed when the constituents are chemically combined.
  - f. The constituents of a compound can be separated only by chemical methods.

#### Mixtures

- a. Mixtures are impure substances.
- b. They are made up of two or more substances mixed physically.
- c. The constituents of a mixture are present in varying ratios.
- d. Mixtures do not have fixed properties. Their properties depend on the nature of their components and the ratios in which they are combined.
- e. In mixtures, no new substance is formed. The properties of a mixture are the same as the properties of its constituents.
- f. The constituents of a mixture can be separated easily by physical methods.

#### **Section E**

37. i. Adipose tissue.  
ii. The cells of the connective tissue are loosely spaced and invaded in and intracellular matrix.  
iii. Calcium and phosphorus compounds.

**OR**

Cartilage is found in the nose, ear, and trachea in the human body.

38. i. Three on detritus, vegetation and other organisms.  
ii. Two, one herbivore and one carnivore  
iii. Only in surface zone

**OR**

Rohu feeds on filamentous algae and decaying vegetation.

39. i. Since blood is a colloid, so Tyndall effect is observed when a beam of light is passed through it since the dispersed particles of a colloid are large, deflect light.  
ii. The phenomenon by which the colloidal particles scatter light is called Tyndall effect. If light is passed through a colloid the light is scattered by the larger colloidal particles and the beam becomes visible.  
iii. Colloidal solutions are a mixture in which the substances are regularly suspended in a fluid. A colloid is a very tiny and small material that is spread out uniformly all through another substance.

**OR**

Fog: Liquid (water drops) acts as dispersed phase and gas (air) as the dispersion medium.