SAMPLE PAPER - 3

Class 09 - Science

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. The melting point of a substance is defined as the constant temperature at atmospheric pressure when: **[1]**

   a) both the solid & liquid exist together.
   b) the solid start melting.
   c) the solid is completely changed into a liquid.
   d) only liquid is present.

2. Which of the following cell functions will stop, if its ribosomes are destroyed? **[1]**

   a) Formation of complex sugars
   b) Lipid metabolism
   c) Protein synthesis
   d) ATP synthesis

3. Match the following with correct response. **[1]**

Column A	Column B
(1) Velocity	(A) m/s^2
(2) Displacement	(B)m/s
(3) Acceleration	(C) $-m/s^2$
(4) Retardation	(D) m

   a) 1-D, 2-A, 3-C, 4-B
   b) 1-B, 2-D, 3-A, 4-C

c) 1-C, 2-B, 3-D, 4-A

d) 1-A, 2-C, 3-B, 4-D

4. The principal cereal crop in India is _____. **[1]**

a) Rice

b) Maize

c) Sorghum

d) Wheat

5. Parenchyma cells are **[1]**

a) doubled walled and specialised

b) thick walled and specialised

c) lignified

d) relatively unspecified and thin walled

6. Which of the following can be made into crystal? **[1]**

a) An Amoeba

b) A Bacterium

c) A Virus

d) A Sperm

7. What is the mass of 0.5 moles of a Hydrogen atom? **[1]**

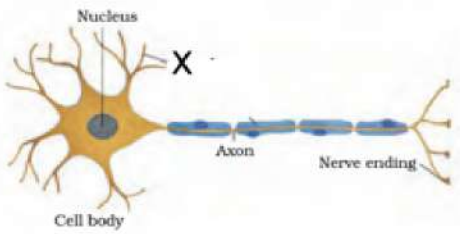
a) 1 g

b) 0.5 g

c) 1.5 g

d) 2.0 g

8. In the figure of neuron, X can be identified as: **[1]**



a) cell body

b) dendrite

c) dendron

d) axon

9. While determining the density of a metal block using a spring balance and a measuring cylinder, a student followed the following steps in this experiment. **[1]**

A. Noted the water level in the measuring cylinder without the metal block.

B. Immersed the metal block centrally in water, without touching the sides and bottom of the cylinder.

C. Noted the water level in the measuring cylinder with the metal block inside it.

D. Removed the metal block from the water and immediately weighed it using a spring balance.

The incorrect step in the procedure is :

a) step C

b) step B

c) step A

d) step D

10. Which of the following is the characteristic of displacement of an object? **[1]**

a) Displacement has only magnitude and no specific direction

b) The magnitude of the displacement is greater than the distance travelled by a moving object

c) Displacement has magnitude as well as specific direction

d) Displacement cannot be zero

11. What weight of Calcium contains the same number of atoms as are present in 2g of Sulphur? **[1]**

a) 4 g
b) 32 g
c) 16 g
d) 2.5g

12. Which of the following sets includes simple permanent tissues? **[1]**

a) Collenchyma, parenchyma, Sclerenchyma
b) Pholem, xylem, collenchyma
c) Sclerenchyma, phloem, collenchyma
d) Parenchyma, phloem, sclerenchyma

13. The compounds synthesised near the ER are packaged and dispatched to various sites inside and outside the cell through: **[1]**

a) rough endoplasmic reticulum
b) Golgi apparatus
c) plasma membrane
d) smooth endoplasmic reticulum

14. "Gram atomic mass of an element and the gram molecular mass of a compound contains the same number of molecules". This is a _____. **[1]**

a) False statement
b) Partially false statement
c) True statement
d) Partially true statement

15. Two chemical species X and Y combine together to form a product P which contains both X and $X + Y \rightarrow P$, X and Y cannot be broken down into simpler substances by simple chemical reactions. Which of the following concerning the species X, Y, and P are correct? **[1]**

i. P is a compound
ii. X and Y are compounds
iii. X and Y are elements
iv. P has a fixed composition

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

16. Which of the following are Indian cattle? **[1]**

i. *Bos indicus*
ii. *Bos domestica*
iii. *Bos bubalis*
iv. *Bos vulgaris*

a) (ii) and (iii)
b) (i) and (ii)
c) (i) and (iii)
d) (iii) and (iv)

17. **Assertion (A):** The speed or velocity of a car running on a crowded city, road changes continuously. **[1]**
Reason (R): The movement of a car on a crowded city road is an example of non-uniform acceleration.

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) A is false but R is true.

18. **Assertion (A):** Gases are compressible but liquids are not. **[1]**
Reason (R): Structure of gas and liquid are different.

a) Both A and R are true and R is the correct
b) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years, the nail is still present there. **[1]**

Reason (R): The girth of the stem or root increases due to apical meristem (cambium).

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) A is false but R is true.

20. **Assertion (A):** The electrons are confined to the energy levels where they revolve. **[1]**

Reason (R): While revolving in the discrete orbits, the electrons radiate energy.

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) A is false but R is true.

Section B

21. How is the power related to the speed at which a body can be lifted? How many kilograms will a man working with the power of 100 W, be able to lift at constant speed of 1 ms^{-1} vertically? (g = 10 ms^{-2}) **[2]**

OR

Why a dead body floats, with its head immersed in water.

22. Explain why should we wear cotton clothes in summer. **[2]**

23. When a sound is reflected from a distant object, an echo is produced. Let the distance between the reflecting surface and the source of sound production remains the same. Do you hear echo sound on a hotter day? **[2]**

24. How can a saturated solution be made unsaturated? **[2]**

25. An object of mass 100 kg is accelerated uniformly from the velocity of 5 ms^{-1} to 8 ms^{-1} in 6 s. Calculate the initial and final momentum of the object. Also, find the magnitude of the force exerted on the object. **[2]**

OR

A motorcar is moving with a velocity of 108 km/h and it takes 4 s to stop after the brakes are applied. Calculate the force exerted by the brakes on the motorcar if its mass along with the passengers is 1000 kg.

26. There are 15 protons and 16 neutrons in the nucleus of an element. Calculate its atomic number and mass number. How will represent the element ? **[2]**

Section C

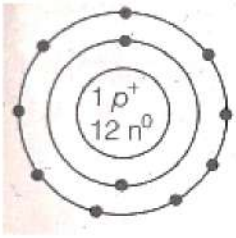
27. Study the given below diagram and answer the following questions: **[3]**

i. Identify the application of ultrasound in the above diagram.

ii. Explain the working principle of this medical procedure.

iii. What is the range of frequencies associated with ultrasound?

28. Given below is the atomic structure of an atom of element $^{23}_{11}A$, according to Bohr's model of atom. **[3]**



i. What is wrong with this structure of atom?

ii. Draw a correct representation of this atom.

iii. Write the chemical formula of the chloride of this element.

29. A ball starts from rest and rolls down 16 m down an inclined plane in 4 s. **[3]**

(a) What is the acceleration of the ball?

(b) What is the velocity of the ball at the bottom of the inclined plane?

OR

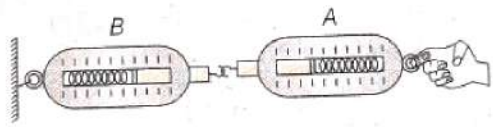
Starting from a stationary position, Rahul paddles his bicycle to attain a velocity of 6 ms^{-1} in 30 s. Then he applies brakes such that the velocity of the bicycle comes down to 4 ms^{-1} in the next 5 s. Calculate the acceleration of the bicycle in both cases.

30. Due to heavy rains and speedy winds a tree broke and fell on the road. Two persons from local shops came and begin to remove that broken part of the tree, but in vain as the log was too heavy. A passerby came to their help with a few solid heavy sticks. Consequently, the heavy log was put aside and the commutation on the road began as usual. **[3]**

(a) Comment upon the value(s) displayed by the passerby?

(b) Name the energy stored when the heavy log of the tree was lifted to some height?

31. Look at the diagram below and answer the following questions: **[3]**



i. When a force is applied through the free end of the spring balance A, then the reading on the spring balance A is 15 g-wt. What will be the measure of the reading shown by spring balance B?

ii. Write the reasons for your answer.

iii. Name the force that balance A exerts on balance B and the force of balance B on balance A.

32. What is nucleoid? How it is different from the nucleus of eukaryotic cell? **[3]**

OR

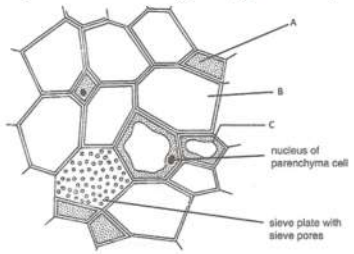
How are the following related to each other?

i. Chromatin network and chromosomes

ii. Chloroplast and chlorophyll

iii. Genes and DNA

33. Study the following diagram of phloem and answer the following questions: **[3]**



i. Identify A, B and C in the given diagram.

ii. What term is used for the end walls of the B?

iii. What are the two functions performed by C?

Section D

34. Show that the weight of an object on the moon is $\frac{1}{6}$th of its weight on the earth. Given, the mass of the earth M_e = 6×10^{24} kg , mass of the moon, M_m =$7{\cdot}4\times10^{22}$ kg , The radius of the earth, R_e = 6400 km and radius of the moon, R_m = 1740 km. **[5]**

OR

i. Prove that, if the earth attracts two bodies placed at the same distance from the centre of the earth with equal force, then their masses will be the same.

ii. Mathematically express the acceleration due to gravity in terms of mass of the earth and radius of the earth.

iii. Why is G called a universal constant?

35. Draw a neat labelled diagram of an animal cell. **[5]**

OR

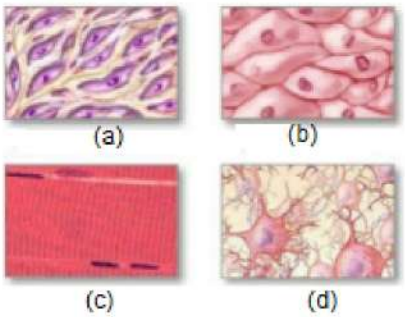
Grass looks green, papaya appears yellow. Which cell organelle is responsible for this?

36. Iron filings and sulphur were mixed together and divided into two parts, A and B. Part A was heated strongly while part B was not heated. Dilute hydrochloric acid was added to both the parts and evolution of gas was seen in both the cases. How will you identify the gases evolved? **[5]**

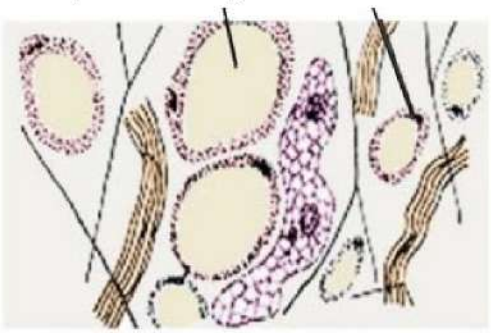
Section E

37. **Read the text carefully and answer the questions:** **[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.



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

OR

What are the components of the matrix of bone?

38. **Read the text carefully and answer the questions:** **[4]**

Fish is a cheap source of animal protein for our food. Fish liver oil is rich in vitamin A and D. Basically fisheries are of two types:

i. **Fin fishery:** It includes capturing, management and exploitation of cartilaginous and bony fishes.

ii. **Shell fishery:** It includes capturing, management and exploitation of crustaceans (prawns, crabs) and molluscs (oysters, mussels etc.).

Depending upon the mode of obtaining fish, fisheries are of two types: **Capture fishing and Culture fishing.**

(i) Mention the two types of fisheries depending upon the mode of obtaining fish.

(ii) Which fatty acid is exclusively found in fish?

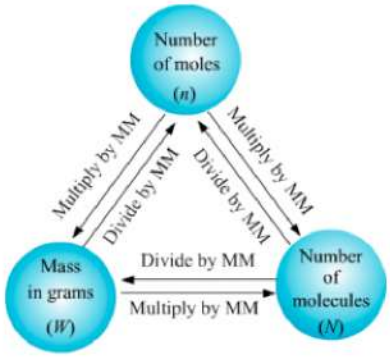
(iii) Is Rohu a bony fish or not? In which type of fisheries it is used?

OR

What is the difference between capture fishery and culture fishery?

39. **Read the text carefully and answer the questions:** **[4]**

Mass is the quantity of matter in a physical body. It is also a measure of the body's inertia, the resistance to acceleration when a net force is applied. An object's mass also determines the strength of its gravitational attraction to other bodies. The SI base unit of mass is the kilogram. The mass of **one mole of a substance is equal to that substance's molecular weight**. For example, the mean molecular weight of water is 18.015 atomic mass units (amu), so one mole of water weight 18.015 grams.



(i) Calculate the mass of 0.5 mole of N_2 gas (mass from mole of molecule).

(ii) Calculate the mass of 0.5 mole of N atoms (mass from mole of atom).

(iii) Calculate the mass of 3.011×10^{23} number of N atoms (mass from number).

OR

Calculate the mass of 6.022×10^{23} number of N_2 molecules (mass from number).

Solution

SAMPLE PAPER - 3

Class 09 - Science

Section A

1. **(a)** both the solid & liquid exist together.
   Explanation: Melting point is defined as the constant temperature at which the solid and the liquid phases of a substance coexist. The melting point of a solid is an indication of the strength of the force of attraction between its particle.
2. **(c)** Protein synthesis
   Explanation: Ribosomes are the site of protein synthesis on rough endoplasmic reticulums. Long-chain of polypeptides are synthesized on the ribosomes.
3. **(b)** 1-B, 2-D, 3-A, 4-C
   Explanation:
   i. The SI unit of velocity is meter per second.
   ii. The SI unit of acceleration is the metre per second square.
   iii. The SI unit of displacement is the meter.
   iv. Retardation is negative acceleration.Therefore its SI unit is metre per second squared with a negative sign.
4. **(a)** Rice
   Explanation: Rice is one of the chief grains of India. India has the largest area under rice cultivation, as it is one of the principal food crops.
5. **(d)** relatively unspecified and thin walled
   Explanation: Parenchyma cells form the bulk of the plant body. Its cells are living and they possess the power of division. The cells are rounded or isodiametric, i.e., equally expanded on all sides. The cells are oval, round, polygonal or elongated in shape with a thin cell wall. It encloses a dense cytoplasm, which contains small nucleus and surrounds large central vacoule.
6. **(c)** A Virus
   Explanation: Viruses are considered as an intermediate between living and non-living cells because they cannot metabolite and reproduce on their own. They can reproduce only when enters in a host's body. They are an exception to cell theory. A virus crystal is a collection of thousands of viruses. A viral crystal is a pore collection used for chemical studies.
7. **(b)** 0.5 g
   Explanation:
   The atomic mass of hydrogen is 1 u. Mass of one mole of Hydrogen is equal to 1 g. Therefore, the mass of 0.5 moles of Hydrogen atom will be $0.5 \times 1 = 0.5$g
8. **(b)** dendrite
   Explanation: The dendrites receive impulses and the axon takes impulses away from the cell body.
9. **(d)** step D
   Explanation: Just on removing, some drops of water will be on the metal. So, it will show excess mass.
10. **(c)** Displacement has magnitude as well as specific direction
    Explanation: The shortest distance between the initial point and the final point is called displacement. Displacement has both magnitude and direction while distance has only magnitude.
11. **(d)** 2.5g
    Explanation: No. of moles present in 2g of Sulphur = $\frac{2}{32}$ = 0.0625 moles.
    The atomic mass of Calcium = 40u.
    Mass of Calcium containing 0.0625 moles of atoms = $0.0625 \times 40 = 2.5$ g
12. **(a)** Collenchyma, parenchyma, Sclerenchyma
    Explanation: Two simple permanent tissue in plants are parenchyma and collenchyma while two complex permanent tissue in plants are xylem and phloem. Sclerenchyma tissue is dead simple permanent tissue of the plant.
13. **(b)** Golgi apparatus
    Explanation: Golgi apparatus is an organelle present in most eukaryotic cells. It is made up of membrane-bound sacs and transport molecules from the endoplasmic reticulum to different locations.

14. **(c)** True statement

Explanation:

The gram atomic mass of an element and the gram molecular mass of a compound contains the same number of molecules, which is equal to 6.022×10^{23} molecules.

15. **(c)** (i), (iii) and (iv)

Explanation: X+Y → P

In this reaction, X and Y are elements as they cannot be broken down into simpler substances by chemical reactions. P is a compound as it is made up of two or more elements that combine in a fixed proportion. Thus P has a fixed composition.

16. **(c)** (i) and (iii)

Explanation: The generic name of a cow (cattle) is *Bos indicus*. It is adapted for the drier regions of the country such as Gujarat and Rajasthan. Buffalo is commonly called Indian water buffalo, its generic name is *Bos bubalis*.

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

Explanation: A body has a non-uniform acceleration if its velocity increases by unequal amounts in equal intervals of time.

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

Explanation: The molecules of a gas are separated very far and there is a lot of empty space between them. Hence gases can be compressed easily. In liquids molecules are closer to each other and can be brought further closer only under very high pressure.

19. **(c)** A is true but R is false.

Explanation: The nail will remain at the same position even after 3 years. This is because a plant or tree grows from its tip (stem or root) not from the point at which it joins the ground. So, the tree will grow but the nail will remain at the same place on the tree trunk.

20. **(c)** A is true but R is false.

Explanation: Neils Bohr proposed that the electrons possess a specific amount of energy which allows them to revolve around the nucleus. The electrons are confined to these energy levels. While revolving in these discrete orbits, the electrons do not radiate energy.

Section B

21. We know that, Power = $\frac{Work\,done\,or\,energy}{time} = \frac{mgh}{t}$ = m.g.$(\frac{h}{t})$

Since, speed = $\frac{Distance}{time} = \frac{h}{t}$

Therefore, mass, m= $\frac{Power}{g \times Speed}$

Hence, mass of a body that can be lifted = $\frac{Power}{g \times Speed} = \frac{100}{10 \times 1}$ = 10 kg

OR

Dead bodies always float on the surface of water, but the head stays within water. The reason is that when the dead body decays its volume increases. Thus, it becomes lighter than water and, hence, floats. However, head being heavy cannot displace water more than its own weight hence it remains under water.

22. During summer, we perspire more because of the mechanism of our body which keeps us cool. When evaporation takes place then sweat particles gain energy from body surface and change into vapour. The heat energy equal to the latent heat of vaporisation is absorbed from the body leaving the body cool. Cotton, being a good absorber of water helps in absorbing the sweat and exposing it to the atmosphere for easy evaporation. On the other hand, synthetic clothes (made of nylon, polyester, etc.) do not absorb much of sweat and therefore, they cannot keep our body cool in summer.
23. As the sensation of sound persists in our brain for about 0.1 s.To hear a distinct echo the time interval between the original sound and the reflected one must be at least 0.1s. Therefore the total distance covered by the sound from the point of generation to the reflecting surface and back should be at least $(344 m/s) \times 0.1 s$ = 34.4 m. Thus, for hearing distinct echoes, the minimum distance of the obstacle from the source of sound must be half of this distance, that is, 17.2 m. Speed of sound will increase with increase in temperature. Therefore, on a hotter day speed of sound will be greater hence echoes may be heard more than once because of multiple reflections of sound.
24. A saturated solution can be made an unsaturated solution in two ways :
    a. By increasing the temperature or by heating.
    b. By adding more of the solvent or by diluting the solution.
25. Mass of object (m) = 100 kg

Initial velocity (u) = 5 ms^{-1}

Final velocity (v) = 8 ms^{-1}

Time (t) = 6s

Initial momentum ($P_{initial}$) = mu

= 100 × 5

= 500 Ns

Final momentum (P_{final}) = mv

= 100 × 8

= 800 Ns

Force exerted on the object (F)

$= \frac{mv-mu}{t} = \frac{800-500}{6}$

$= \frac{300}{6}$ = 50N

OR

We have given that,

The initial velocity of the motorcar u = 108 km/h

$= \frac{108\times1000m}{(60\times60s)}$

= 30 ms^{-1}

and the final velocity of the motorcar v = 0 ms^{-1}

The total mass of the motorcar along with its passengers = 1000 kg and the time taken to stop the motorcar,

t = 4 s.

We have the magnitude of the force (F) applied by the brakes as

$\frac{m(v-u)}{t}$

On putting the values in the above equation, we get

F = 1000 kg × (0 - 30) ms^{-1} $= \frac{1000kg\times(0-30)ms^{-1}}{4s}$

= - 7500 kg ms^{-2} or - 7500 N

The negative sign tells us that the force exerted by the brakes is opposite to the direction of motion of the motorcar.

26. No. protons= 15 and No. of neutrons = 16

Atomic number of the element = No. of protons = 15

Mass number of the element = No. of protons (15) + No. of neutrons (16) = 15 + 16 = 31

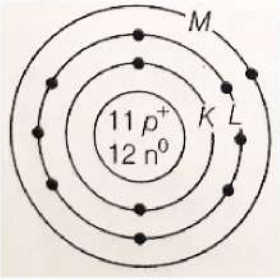
Representation of the element= $^{31}_{15}X$

The element with atomic number (Z = 15) is actually phosphorus (P). It is represented as $^{31}_{15}P$.

Section C

27. i. Ultrasound is used to monitor the development of the foetus inside the mother's womb.
    ii. The ultrasound scanner transmits ultrasound into the mother's body and receives echoes formed by the reflection of ultrasound from inside. The ultrasound echoes form a picture of a developing baby on a monitor which helps the doctor to keep a track of the developing baby. Thus ultrasonography is used for the examination of the foetus during pregnancy to detect any growth and abnormalities.
    iii. The sound above 20,000Hz is regarded as ultrasound

28. 1. The element A is Na has three shells K, L and M but here only 2 shells are given, Further, L-shell cannot have more than 8 electrons but here 9 electrons are given.
    2. The correct structure is



    3. As Na has 1 valence electron, thus it has a valency of +1 and chlorine has a valency of -1. Hence, the formula of its chloride is *A*CI, i.e. NaCl.

29. u= initial velocity =0 (body starts from rest)

S= distance = 16m

T= time = 4s

(i) From, $s= ut+at^2$

$16 = 0 \times t + \frac{1}{2} \times a \times (4)^2$

$16 = \frac{1}{2} \times a \times 16$

$\frac{16 \times 2}{16}$

$a = 2m/s^2$

(ii) From, v = u +at

$v = 0 + 2 \times 4$

v= 8m/s

OR

In the first case:

Since body starts from stationary position,

∴. Initial velocity, u = 0

final velocity, $v = 6\ ms^{-1}$

time, t = 30 s

$a = \frac{v-u}{t}$

Substituting the given values of u, v, and t in the above equation. we get

$a = \frac{(6ms^{-1} - 0ms^{-3})}{30s}$

$= 0.4\ ms^2$

In the second case:

initial velocity, $u = 6\ ms^{-1}$

time, t = 5 s

$\text{Then. } a = \frac{(4ms^{-2} - 6ms^{-2})}{5s}$

$= -0.4\ ms^{-2}$

The acceleration of the bicycle in the first case is 0.2 ms^{-2} and in the second case, it is –0.4 ms^{-2}

30. (a) Social value, conceptual value, presence of mind.

(b) Potential energy.

31. i. 15 g-wt.

ii. From Newton's third law, the force exerted by B on A and force exerted by A on B are equal.

iii. Force of reaction balance A exerts on balance B and force of action balance B exerts on balance A.

32. In prokaryotic cell, genetic material in not surrounded by membrane. This undefined region where genetic material is present, is known as nucleoid.

In eukaryotic cell, genetic material is surrounded by nuclear membrane.

OR

i. The cell contains nuclear material which can be seen as an entangled mass of thread-like structure when it is not dividing. The chromatin material gets organized into rod-like structures called chromosomes when the cell is about to divide.

ii. Chloroplasts are green-coloured plastids that contain a green coloured pigment called chlorophyll.

iii. Genes are the functional segments of DNA (present on DNA) that control a specific trait by making a specific protein.

33. i. A represents companion cells, B represents sieve tubes, and C represents phloem parenchyma. which are small thin-walled cell containing dense and very active cytoplasm and large elongated nucleus.

ii. The sieve tubes end walls are perforated by numerous pores and are called sieve plates.

iii. The phloem parenchymatous cell performs the following functions:

a. Storage of food.

b. Slow lateral conduction of food.

Section D

34. Suppose the mass of the moon is M_m and its radius is R_m. Let a body of mass m is placed on the surface of the moon.

Therefore, the weight of the body on the moon, $W_m = mg' = \frac{GM_m m}{R_m^2}$ .....(1)

Mass of body, m will remain same on earth and moon.

Here, The weight of the same body on the earth's surface, W_e =mg = $\frac{GM_em}{R_e^2}$ .....(2)

Where M_e = Mass of earth and R_e = Radius of the earth.

Dividing equation (1) by (2), we get

$\frac{W_m}{W_e} = \frac{M_m}{M_e} \times \frac{R_e^2}{R_m^2}$ .....(3)

Now, the mass of the earth, $M_e = 6 \times 10^{24}$ kg (Given)

mass of the moon, $M_m = 7{\cdot}4 \times 10^{22}$ kg (Given)

The radius of the earth, R_e = 6400 km and radius of the moon, R_m = 1740 km

Now, Putting these values in equation (3), we get

$\frac{W_m}{W_e} = \frac{7.4\times10^{22}kg}{6\times10^{24}kg} \times (\frac{6400\ km}{1740\ km})^2$

or $\frac{W_m}{W_e} \approx \frac{1}{6}$ or $W_m = \frac{W_e}{6}$ Hence proved.

Therefore, The weight of the body on the moon is about one-sixth of its weight on the earth.

OR

i. Let the two bodies have masses m_1 and m_2 and they are placed at the same distance R from the centre of the earth. According to the question, if the same force acts on both of them, then

$F_1 = \frac{GMm_1}{R^2}$ ....(i)

and $F_2 = \frac{GMm_2}{R^2}$ ....(ii)

As, $F_1 = F_2$

Hence, $\frac{GMm_1}{R^2} = \frac{GMm_2}{R^2}$

So, $m_1 = m_2$, their masses will be the same.

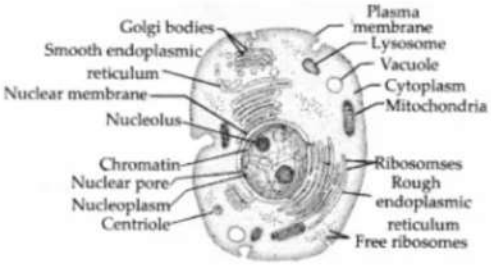
ii. Mathematically, $g = \frac{GM}{R^2}$

Where, g = acceleration due to gravity

G = universal gravitational constant, M = mass of the earth and R = radius of the earth

iii. G is known as the universal gravitational constant because its value remains the same all the time everywhere in the universe, applicable to all bodies whether celestial or terrestrial.

35. **Diagram of an animal cell is given below:**



OR

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.

36. **Part A:** $Fe + S \xrightarrow{\Delta} FeS$

$FeS + 2HCL(dil.) \rightarrow FeCl_2 + H_2S\uparrow$

Here H_2S gas is produced, which is identified by its characteristic smell of rotten eggs.

Part B: $Fe + S \rightarrow mixture$

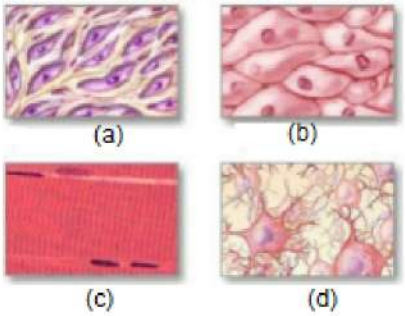
$Fe + S + 2HCL(dil.) \rightarrow FeCl_2 + H_2\uparrow$

Here H_2 gas is produced. Hydrogen gas is tested by bringing a burning matchstick near the mouth of the test tube. It burns with a pop sound and water is formed.

Section E

37. **Read the text carefully and answer the questions:**

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) Adipose tissue.

(ii) The cells of the connective tissue are loosely spaced and invaded in and intracellular matrix.

OR

Calcium and phosphorus compounds.

38. **Read the text carefully and answer the questions:**

Fish is a cheap source of animal protein for our food. Fish liver oil is rich in vitamin A and D. Basically fisheries are of two types:

i. **Fin fishery:** It includes capturing, management and exploitation of cartilaginous and bony fishes.

ii. **Shell fishery:** It includes capturing, management and exploitation of crustaceans (prawns, crabs) and molluscs (oysters, mussels etc.).

Depending upon the mode of obtaining fish, fisheries are of two types: **Capture fishing and Culture fishing.**

(i) The two types of fisheries depending upon the mode of obtaining fish are capture and culture fisheries.

(ii) Omega 3 fatty acid is exclusively found in the fishes.

(iii)Yes, Rohu is a bony fish. It can be used in fin fishery.

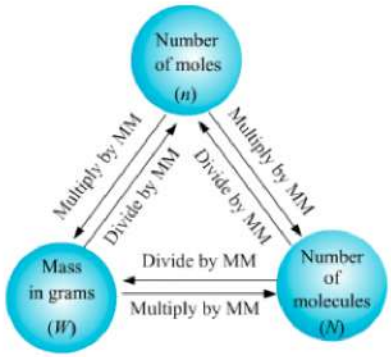
OR

Capture fishery is traditional fishing where a fisherman catches the fish from natural resources like the sea and rivers. A cultural fishery is one where the fish are obtained and reared for commercial purposes.

39. **Read the text carefully and answer the questions:**

Mass is the quantity of matter in a physical body. It is also a measure of the body's inertia, the resistance to acceleration when a net force is applied. An object's mass also determines the strength of its gravitational attraction to other bodies. The SI base unit of mass is the kilogram. The mass of **one mole of a substance is equal to that substance's molecular weight**. For example, the

mean molecular weight of water is 18.015 atomic mass units (amu), so one mole of water weight 18.015 grams.



(i) Mass = molar mass × number of moles

$\Rightarrow m = M \times n = 28 \times 0.5 = 14\ g$

$\therefore$ Mass from mole of molecule = 14 g

(ii) Mass = molar mass × number of moles

$\Rightarrow m = M \times n = 14 \times 0.5 = 7\ g$

$\therefore$ mass = 7 g

(iii) The number of moles, $n = \frac{\text{given number of particles}}{\text{Avogadro number}} = \frac{N}{N_A} = \frac{3.011 \times 10^{23}}{6.022 \times 10^{23}}$

$\Rightarrow m = M \times n = 14 \times \frac{3.011 \times 10^{23}}{6.022 \times 10^{23}}$

$= 14 \times 0.5 = 7\ g$

$\therefore$ mass from mole of atom = 7 g

OR

$n = \frac{N}{N_A}$

$\Rightarrow m = M \times \frac{N}{N_A} = 28 \times \frac{6.022 \times 10^{23}}{6.022 \times 10^{23}}$

$= 28 \times 1 = 28\ g$

$\therefore$ mass = 28 g