Class: IX
SESSION : 2022-2023
SUBJECT: Science (086)
SAMPLE QUESTION PAPER - 2
with SOLUTION

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 inter-particle forces are the strongest in **[1]**

   a) Sodium Bromide b) Ammonia

   c) Carbon dioxide d) Ethyl alcohol

2. Work done is said to be zero if the applied force is _____ to the direction of displacement. **[1]**

   a) perpendicular b) power

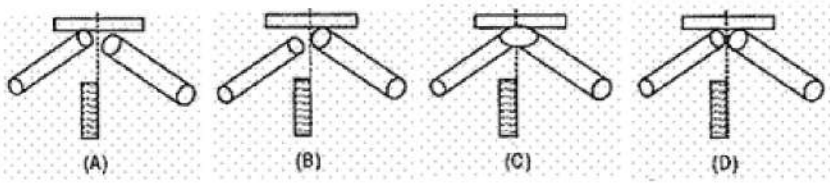
   c) joule d) mass

3. The well defined nucleus is absent in _____. **[1]**

   a) Prokaryotic cell b) Plant cell

   c) Animal cell d) Eukaryotic cell

4. Which of the following is the correct experimental set-up for verification of laws of reflection of sound? **[1]**



   a) D b) C

   c) A d) B

5. When a 12 N force acts on 3 kg mass for a second, the change in velocity is (in m/s) **[1]**

a) 18 b) 36

c) 2 d) 4

6. If an electric iron 1200W is used for 30 minutes every day, then electric energy consumed in the month of April is: **[1]**

a) 8 kWh b) 10 kWh

c) 18 kWh d) 20 kWh

7. The substance found in the cell wall of cork or bark that makes it impervious to water is **[1]**

a) cutin b) lignin

c) suberin d) lipids

8. The membrane of the Golgi apparatus has connections with those of: **[1]**

a) nuclear membrane b) endoplasmic reticulum

c) cell membrane d) mitochondria

9. Preventive and control measures adopted for the storage of grains include **[1]**

a) strict cleaning b) fumigation

c) all of these d) proper drying

10. Reflection of sound obeys the law **[1]**

a) $\angle i = 2 \angle r$ b) $\angle i = \angle r$

c) $\angle i < \angle r$ d) $\angle i > \angle r$

11. What happens on adding dilute HCl to a mixture of iron filling and sulphur powder? **[1]**

a. H_2S is formed.

b. A colourless and odourless gas is formed.

c. A greenish solution appears.

d. FeS is formed.

a) (a), (b) and (c) are correct b) (b) and (c) are correct

c) All of these d) (a) and (b) are correct

12. 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

13. How many moles are present in 40 g of He? **[1]**

a) 10 moles

b) 13 moles

c) 14 moles

d) 12 moles

14. Contractile proteins are present in _____ tissue. **[1]**

a) areolar

b) adipose

c) nervous

d) muscular

15. When a body falls freely towards the earth, then its total energy **[1]**

a) increases

b) decreases

c) remains constant

d) first increases and then decreases

16. The cell organelles (other than the nucleus) which contain DNA are: **[1]**

a) Plastids and lysosomes

b) Golgi apparatus and lysosomes

c) Plastids and mitochondria

d) Mitochondria and Golgi apparatus

17. **Assertion (A):** Fumigation of the grains using chemicals is done before storage in warehouses. **[1]**
Reason (R): Fumigation gives a nice colour to the grains.

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):** The acceleration experienced by an object during free fall is dependent on its mass. **[1]**
Reason (R): All objects hollow or solid, big or small, should fall at the same rate.

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.

19. **Assertion (A):** The flash of lightning is seen before the sound of thunder is heard. **[1]**
Reason (R): Speed of sound is greater than speed of light.

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):** When a bullet is fired from a gun, there is a forward force on the bullet and recoil of gun. **[1]**
Reason (R): Every action has an equal and opposite reaction.

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. Calculate the number of aluminium ions in 0.051 g of aluminium oxide (Al_2O_3) **[2]**

22. The room temperature on Celsius scale is 25^oC. Convert it into the other two scales of measurement. **[2]**

OR

Give an experiment to show that ammonium chloride undergoes sublimation.

23. Mention two differences between blood platelets? **[2]**

24. What are lysosomes, peroxisomes and centrosome and write their functions? **[2]**

25. Differentiate between distance and displacement? **[2]**

26. A boat at anchor is rocked by waves, whose consecutive crests are 100 m apart. If the wave velocity of moving crests is 20 ms^{-1}, calculate the frequency at which the boat will rock? **[2]**

OR

Prove that $V = \upsilon\lambda$, where the symbols have their usual meanings.

Section C

27. Shashank placed an iron cuboid of dimensions 4 cm $\times$ 7 cm $\times$ 10 cm on a tray containing fine sand. He placed the cuboid in such a way that it was made to lie **[3]**

on the sand with its faces of dimensions

i. 4 cm × 7 cm,

ii. 7cm × 10cm,

iii. 4 cm × 10 cm.

If the density of iron is nearly 8 g cm^{-3} and g =10 ms^{-2}, find the minimum and maximum pressure as calculated by Shashank.

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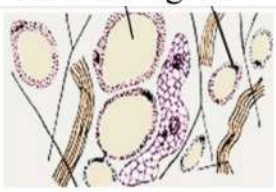
28. Why do not the dispersed phase particles in a colloidal solution combine with one other? **[3]**

29. Observe the given below image of the tissue and answer the following questions: **[3]**

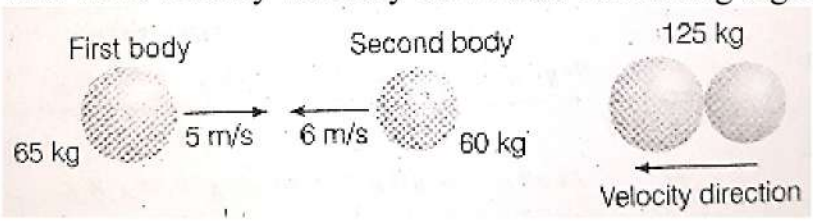


i. Identify the type of tissue shown in the given image.

ii. Where is it found?

iii. Why this tissue acts as an insulator?

30. Two bodies as shown in the figure collide with each other and join thereafter, with what velocity will they move after combining together? **[3]**



31. Differentiate between physical and chemical change? **[3]**

OR

Why is it that a wooden chair should be called a solid and not a liquid?

32. Write a short note on uniform circular motion. **[3]**

OR

Two trains A and B of length 400 m each are moving on two parallel tracks with uniform speed of 72 kmh^{-1} in the same direction with A ahead of B. The driver of B decides to overtake A and accelerates by 1 ms^{-2}. If after 50s, the guard of B just passes the driver of A, what was the original distance between them?

33. Differentiate between homogeneous and heterogeneous mixtures with examples. **[3]**

Section D

34. Describe valency by taking the examples of silicon and oxygen. **[5]**

OR

Show diagrammatically the electron distribution in a sodium atom and a sodium ion and also give their atomic number.

35. Write differences between animal tissue and plant tissue. **[5]**

OR

Draw well-labeled diagrams of various types of muscles found in the human body.

36. Write the main functions of atleast ten cell components. **[5]**

Section E

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

Sulphur dioxide is a colorless gas with a pungent odor. It is a liquid when under pressure, and it dissolves in water very easily. Sulphur dioxide in the air comes mainly from activities such as the burning of coal and oil at power plants or from copper smelting. In nature, sulphur dioxide can be released into the air from volcanic eruptions.

'SO_2 is an air pollutant released during the burning of fossil fuels and from automobile exhaust'.

(i) What are the valencies of sulphur in SO_2 and SO_3?

(ii) Find out the number of molecules in 5 moles of SO_2.

(iii) Calculate the number of moles in 320 g of SO_2 gas.

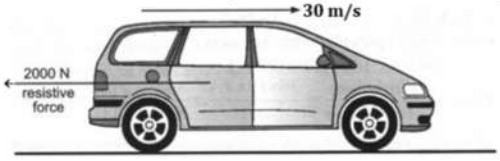
OR

Calculate the molar mass of 10 moles of sodium sulphite.

[Given, atomic masses of S = 32 u, O = 16 u, Na = 23 u and $N_A = 6.022 \times 10^{23}$ per mol]

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

A car of mass 900 kg is travelling at a steady speed of 30 m/s against a resistive force of 2000 N, as illustrated in figure.



(i) Calculate the kinetic energy of the car.

(ii) Calculate the energy used in 1.0 s against the resistive force.

OR

What is the minimum power that the car engine has to deliver to the wheels?

39. **Read the text carefully and answer the questions:** **[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 accomodated in different zones of pond culture.

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

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

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

OR

Which fish feeds on filamentous algae and decaying vegetation?

SOLUTION

Section A

1. **(a)** Sodium Bromide
   Explanation: Solids substances have the strongest inter-particle force of attraction. In the given substances, **sodium bromide is solid**, ethyl alcohol is liquid, and ammonia and carbon dioxide are gases. So, the particles of Sodium bromide have the strongest force of attraction.
2. **(a)** perpendicular
   Explanation: Work is done only when a certain force is applied on an object and the object moves a certain distance on the direction of the applied force. Hence work done is zero when the direction is perpendicular.
3. **(a)** Prokaryotic cell
   Explanation: Prokaryotic cells do not have a nuclear membrane, and cell organelles are also not well enveloped.
4. **(a)** D
   Explanation: $\angle r = \angle i$ at the point of incidence
5. **(d)** 4
   Explanation: $v = \frac{F \times t}{mass} = \frac{12 \times 1}{3} = 4m/s$
6. **(c)** 18 kWh
   Explanation: P = $\frac{1200}{1000}$ = 1.2 kW
   t = $\frac{30}{60}$ = 0.5 h
   E = Power × time × days = 1.2 × 5 × 30 = 18 kWh.
7. **(c)** suberin
   Explanation: The cork is impervious to water due to suberin deposition in the cell wall of its cells. The walls of cork cells are heavily thickened with an organic substance, suberin. Suberin makes these cells impervious to water and gases.
8. **(b)** endoplasmic reticulum
   Explanation: The Golgi apparatus functions as a factory in which proteins received from the Endoplasmic reticulum are further processed and sorted for transport to their eventual destinations: lysosomes, the plasma membrane, or secretion.
9. **(c)** all of these
   Explanation: Preventive and control measures adopted for the storage of grains include strict cleaning of the produce before storage, proper drying of the product first in sunlight and then in a shade, and fumigation using chemicals that can kill pests.
10. **(b)** $\angle i = \angle r$
    Explanation: Angle of incidence is equal to the angle of reflection.
    Sound and light obey the laws of reflection $\angle r = \angle i$.
11. **(b)** (b) and (c) are correct
    Explanation: $Fe(s) + 2HCl(aq) \rightarrow FeCl_2(aq) + H_2(g)$
    Sulfur will not react with HCl and it will not conduct electricity.
    $FeCl_2$ is a Pale blue-green. And H_2 is a colourless and odourless gas.
    So, Statement B and C are the correct statements.
12. **(d)** step D
    Explanation: Just on removing, some drops of water will be on the metal. So, it will show excess mass.

13. **(a)** 10 moles
Explanation: Number of moles of Helium = Mass of Helium / Molar mass of Helium = $\frac{40}{4}$ = 10 moles. Atomic mass or molar mass of Helium is 4 u.
14. **(d)** muscular
Explanation: Contractile proteins are found in muscles, as they are associated with the movement of the body or limbs. The contraction and relaxation of contractile proteins, present in muscles bring about movements of limbs, internal organs, etc.
15. **(c)** remains constant
Explanation: Since, total energy of the system is always conserved, so when a body falls freely towards the earth, then its total energy remains constant i.e., the sum of the potential energy and kinetic energy of the body would be same at all points.
16. **(c)** Plastids and mitochondria
Explanation: In eukaryotes, DNA is generally membrane-bound. Hence in eukaryotes, it is found within the nucleus, mitochondria (animal cell), and plastids (chloroplasts, plant cells).
17. **(c)** A is true but R is false.
Explanation: Fumigation of the grains using chemicals is done before storage in warehouses to protect them from pests like insects, rodents, fungi, mites and bacteria. It does not give a nice colour to the grains.
18. **(d)** A is false but R is true.
Explanation: The acceleration experienced by an object during free fall is independent of its mass. This means that all objects hollow or solid, big or small, should fall at the same rate.
19. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: The speed of sound is 340 m/s and speed of light is 3×10^8 m/s in air. Thus flash of lightning is seen before the sound of thunder is heard.
20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true and R is the correct explanation of A.

Section B

21. Step I: Calculation of no. of moles in 0.051 g of Al_2O_3
Gram molecular mass Al_2O_3 = 2 × Gram atomic mass of Al + 3 × Gram atomic mass of O
= (2 × 27g) + (3 × 16g) = 102g

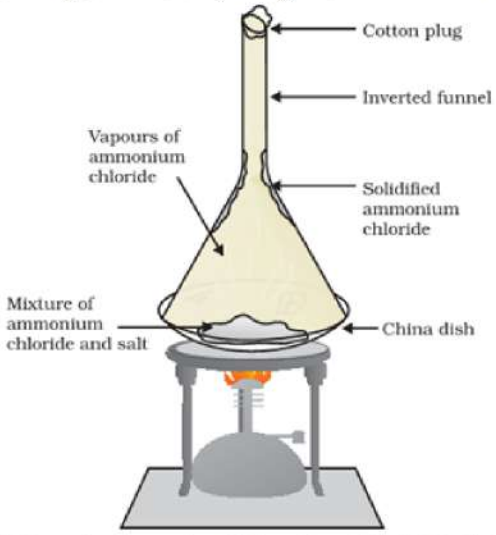
Now, 102 g of Al_2O_3 = 1 mol
$\therefore$ 0.051 g of $Al_2O_3 = \frac{(0.051g)}{(102g)} \times (1mol) = 0.0005$ mol
Step II: Calculation of no. of Al ions in 0.001 moles of Al_2O_3
1 mole of Al_2O_3 contain Al atoms = $2 \times N_o$
0.0005 mole of Al_2O_3 contain Al atoms = $2 \times 0.005 \times N_o$
$= 2 \times 0.0005 \times 6.022 \times 10^{23} = 6.022 \times 10^{20}$ atoms
In Al_2O_3 the valency of Al = 3+
No. of aluminium ions (Al^{3+}) present is the same as the no. of Al atoms
$\therefore$ No. of Al^{3+} ions = 6.022×10^{20} ions
22. Temperature on Kelvin scale = 25 + 273
= 298 K

Temperature on Fahrenheit scale $= \frac{9}{5} \times 25 + 32 = 77^0\text{F}$

OR

Experiment to show that ammonium chloride (NH_4Cl) undergoes sublimation:-

a. Take a china dish with crystals of ammonium chloride (NH_4Cl) and cover it with an inverted glass funnel with a cotton fitted at the top.
b. Put the china dish on a burner and heat the crystals.
c. As soon as the crystals are heated, we observe the vapours of ammonium chloride (NH_4Cl) rising in the funnel. These vapours get solidified along the walls at the upper end of the funnel which is a colder part.
d. This shows that solid ammonium chloride does not undergo liquid state but directly changes to vapour state which then solidifies i.e. it undergoes sublimation (solid changes directly to gases without undergoing liquid state).



23. (a) Blood contains blood cells (RBC, WBC, and Platelets) as well as plasma whereas lymph contains plasma and leucocytes (lymphocytes are most abundant).
(b) Blood has more proteins, calcium and phosphorus whereas plasma has few proteins and less calcium and phosphorus.

24. i. Lysosomes These are membrane bound sacs that are filled with digestive enzymes. They are found in cytoplasm of all except mammalian RBCs and are formed by Golgi apparatus. Function It help to keep the cell clean by digesting any foreign material that enters the cell.
ii. Peroxisomes These are found in plant photosynthesising cells and liver-kidney cells of vertebrates and they are bounded by a unit membrane. Function They are involved in removal of toxic substances by oxidative reactions. In plant cells, they help in photorespiration.
iii. Centrosome It consists of two granule-like centrioles and found in animal cell only. Function It helps in cell division in animal cells.

25.

BASIS FOR COMPARISON	DISTANCE	DISPLACEMENET
Meaning	Distance refers to the amount of space between two points, measured along the actual path, linking them.	Displacement refers to the amount of space between the two points, measured along the minimum path linking them.
What is it?	Length of the total avenue	Least distance between starting and

	traversed by the body.	ending point.
Quantity	Scalar Quantity	Vector Quantity
Information	Gives complete information of the route followed by the body.	Does not give complete information of the route followed by the body.
Time	Distance can never decrease with time.	Displacement can decrease with time.
Values	Positive	Positive, Negative or Zero
Unique path	No	Yes
Denoted by	d	s
Formula	Speed × Time	Velocity × Time

26. Given: Distance between two consecutive crests = Wave length = 100 m

Wave velocity = 20 ms^{-1}

Using the expression V = v × λ we have

$v = \frac{V}{\lambda} = \frac{20}{100} = 0.2$ Hz

OR

Let the time period of a wave be T seconds.

In T seconds, number of waves generated = 1.

So, in 1 second number of waves generated = $\frac{1}{T}$

But number of waves generated in 1 second is frequency.

Therefore, $v = \frac{1}{T}$

Now, Velocity = $\frac{\text{Distance travelled}}{\text{Time taken}}$

$= V = \frac{\lambda}{T}$

$= V = \frac{1}{T}.\lambda$

$V = v\lambda$

Section C

27. ∴ Mass of cuboid = Volume × Density = (4 cm × 7 cm × 10 cm) × 8 g cm^{-3} [∵ Volume of cuboid= l × b × h]

= 2240 g = 2.24 kg

Force applied by the cuboid on the sand = mg = 2.24 × 10 = 22.4N [∵ g = 10 ms^{-2}]

Pressure will be minimum when area of the face of cuboid kept on sand is maximum, i.e. in the case of face with 7 cm × 10 cm.

Area of the race = 7 cm × 10 cm = $\frac{7}{100}$m × $\frac{10}{100}$m

= 0.07 m × 0.1 m = 0.007 m^2

Minimum pressure = $\frac{\text{Force}}{\text{Area}} = \frac{22.4}{0.007} = 3200\text{Nm}^{-2}$

Pressure will be maximum when area of face of cuboid kept on the sand is minimum, i.e. in the case of face with 4 cm × 7cm.

Area of the face = 4 cm × 7 cm = $\frac{4}{100}$m × $\frac{7}{100}$m = 0.0028m^2

Maximum pressure = $\frac{22.4}{\text{Area}} = \frac{22.4}{0.0028} = 8000\text{Nm}^{-2}$

28. They do not come closer because of the presence of either positive or negative charge on them. Due to mutual repulsion, these particles remain scattered in a colloidal solution.

29. i. The given image shows adipose connective tissue.

ii. Adipose connective tissue is found below the skin and between internal organs.

iii. The cells of adipose connective tissue are filled with fat globules. So the storage of fats let it act as an insulator.

30. Given, $m_1 = 65$ kg, $m_2 = 60$ kg

$u_1 = +5$ m/s positive direction

$u_2 = -6$ m/s negative direction, $v = ?$

Total momentum of two bodies before collision = $m_1u_1 + m_2u_2$

$= 65 \times 5 + 60 \times (-6) = -35$ kg-m/s

If v is the velocity of two combined bodies.

Agter collision, the total momentum will be = $m_1v_1 + m_2v_2$ [$\because v_1 = v_2 = v$]

$=(65 + 60)$ kg $\times$ v m/s $= 125$ v kg-m/s

$\therefore$ According to the law of conservation of momentum,

$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2 \Rightarrow -35 = 125v$

$\therefore v = \frac{-35}{125} = -0.28\ m/s$

So, two bodies will move with a velocity of 0.26 m/s in the direction of the second body.

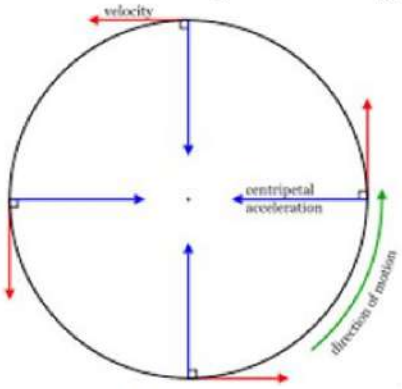
31.

	Physical Changes		Chemical Change
1.	It is not permanent and can easily be reversed.	1.	It is permanent and cannot be easily reversed.
2.	It does not lead to formation of new substances.	2.	It leads to the formation of new substances.
3.	No change in mass is noticed.	3.	There is a change in mass of reactants and products.
4.	The energy changes observed are small.	5.	Large energy changes are observed.

OR

A wooden chair should be called a solid not a liquid because the particles of wooden chair are very close to each other, it has negligible compressibility and it maintains its shape when subjected to outside force.

32. 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.

OR

Initial speed of each train $u = 72\ kmh^{-1} = 20\ ms^{-1}$

Distance travelled by train A in 50 s = $20 \times 50 = 1000$ m

Distance travelled by train B in 50 s with an acceleration of 1 ms^{-2} is

$20 \times 50 + \frac{1}{2}\ (1) \times (50)^2 = 2250$m using $S = ut + \frac{1}{2}\ at^2$

Therefore the original distance between the trains is 2250 - 1000 = 1250 m

33.

Homogeneous mixture	Heterogeneous mixture
These are called as solutions.	These are called as suspensions/colloids.
Substances are Uniformly distributed.	These substances are Unevenly distributed.
These are not visible to the naked eye, but visible through the microscope.	These are easily visible to the naked eye and also through microscope.
The particles appear smaller in size.	The particles are either smaller or larger in size.
These are pure substances.	These are not pure substances.
They represent same physical properties.	They do not possess same physical properties.
Examples include milk, gasoline, sugar solution, corn oil, fog etc	Examples are mixture of mud & water, beach sand, vinegar, air cloud etc

Section D

34. The valency of an element is the combining capacity of that element. It is determined by the number of electrons present in the outermost shell (valence shell) of an atom of that element, if the number of valence electrons of an atom of an element is less than or equal to 4, then the valency of that element is equal to the number of valence electrons. On the other hand, if the numbcr of valence electrons of the atom of an element is greater than 4, then the valency of that element is obtained by subtracting the number of valence electrons from 8.

Valency of Silicon (Si) : Atomic number of the element is 14. Its electronic distribution is; K(2), L(8), M(4).

As silicon atom has four valence electrons, it can lose four electrons to complete its octet. At the same time, it can also gain four electrons. Thus, the valency of silicon is 4.

Valency of oxygen (O) : Atomic number of the element is 8. Its electronic distribution is : K(2), L(6)

As oxygen atom has six valence electrons, it needs two electrons to complete its octet (8 - 6 = 2). Therefore, valency of oxygen is 2.

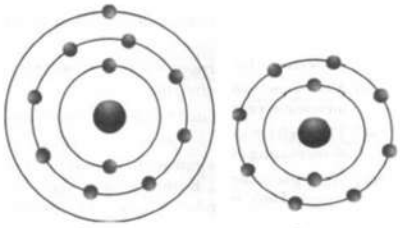
OR

The atomic number of sodium atom is 11. Therefore, it has 11 electrons. K shell can have a maximum of 2 electrons. L shell accommodates a maximum number of 8

electrons. M shell will have 1 electron (remaining electron = 11 - 2 - 8).

A positively charged sodium ion (Na^+) is formed by the removal of one electron from a sodium atom. So, a sodium ion has 11 - 1 = 10 electrons. Thus, electronic distribution of a sodium ion will be 2, 8 (2 + 8 = 10).

The atomic number of an element is equal to the number of protons in its nucleus. A sodium atom, as well as a sodium ion, contains the same number of protons. Therefore, both of them have an atomic number of 11.



Sodium atom Sodium ion

35.

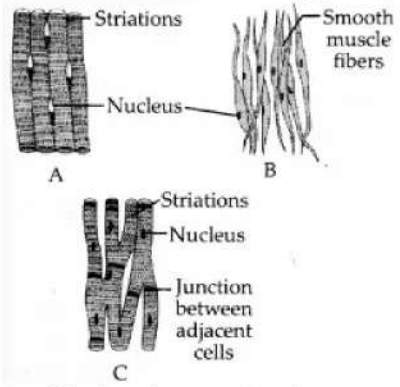
Plant Tissues	Animal Tissues
In plants, dead supportive tissues are more abundant as compared to living tissues.	In multicellular animals living tissues are more common as compared to dead tissues.
They require less maintenance energy as they are autotrophic and can make their own food.	They require more maintenance energy as they are heterotrophic and have to move in search of food.
There is a differentiation of tissues into meristematic and permanent tissues, which are localized in certain regions of plant-based on their dividing capacity.	Such differentiation is absent in animals as their growth is uniform.
Due to the activity of meristematic tissue plants continue to grow throughout life.	Animals do not show growth after reaching maturity. Reparative growth is, however, present.
The organization of plant tissues is simple.	The organization of animal tissues is complex with the development of more specialized and localized organs and organ systems.
Tissue organization is meant for a stationary habit of plants.	Tissue organization is targeted towards the high mobility of animals.

OR

The three main types of muscular tissues found in the human body are:

i. Skeletal (striated) muscle tissue
ii. Smooth (Non-striated) muscle tissue
iii. Cardiac muscle tissue.

The well-labelled diagrams of these tissues are as follows:



A. Skeletal muscle tissue.
B. Smooth muscle tissue
C. Cardiac muscle tissue

36. The ten cell components are:
    i. **Plasma membrane:** It acts as a semipermeable membrane and allows only selective substances to pass through it.
    ii. **Chromosomes:** To carry hereditary characters of an organism from one generation to another.
    iii. **Lysosomes:** Breakdown of unwanted macromolecules is the main function of these organelles.
    iv. **Ribosomes:** These help in protein synthesis.
    v. **Nucleus:** Control centre of the cell. It contains cellular DNA (genetic information) in the form of genes.
    vi. **Mitochondria:** The main function of mitochondria in aerobic cells is the production of energy by the synthesis of ATP.
    vii. **Nucleolus:** Biosynthesis of ribosomal RNA (rRNA) and acts as a platform for protein synthesis.
    viii. **Cell wall:** It provides protection and rigidity to the plant cell.
    ix. **Chloroplasts:** These are the sites of photosynthesis within plant cells.
    x. **Endoplasmic reticulum:** Serves as channels for transport of materials.

Section E

37. **Read the text carefully and answer the questions:**
Sulphur dioxide is a colorless gas with a pungent odor. It is a liquid when under pressure, and it dissolves in water very easily. Sulphur dioxide in the air comes mainly from activities such as the burning of coal and oil at power plants or from copper smelting. In nature, sulphur dioxide can be released into the air from volcanic eruptions. 'SO_2 is an air pollutant released during the burning of fossil fuels and from automobile exhaust'.

(i) Valency of sulphur in $SO_2 = 4$
Valency of sulphur in $SO_3 = 6$

(ii) $5 \times$ Avogadros number $= 5 \times 6.022 \times 10^{23}$
5 mole of $SO_2 = 3.011 \times 10^{23}$ molecules

(iii) Mass = 320 g, Molar mass (m) of
$SO_2 = 32 + 2 \times 16 = 64$ g/mol
$\Rightarrow n = \frac{m}{M} = \frac{320}{64} = 5$ moles

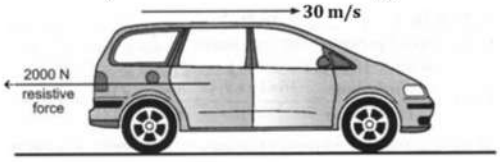
OR

Molar mass of 10 moles of Na_2SO_3

$= 10\ [23 \times 2 + 32 + 16 \times 3] = 1260$ g

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

A car of mass 900 kg is travelling at a steady speed of 30 m/s against a resistive force of 2000 N, as illustrated in figure.



(i) Kinetic energy $= \frac{1}{2}mv^2$

$= \frac{1}{2} \times 900 \times (30)^2 = \frac{1}{2} \times 900 \times 900$

$= 4{,}05{,}000$ J

(ii) Energy used = Work done against resistive force

= Force $\times$ Distance

$= 2{,}000 \times 30 = 60{,}000$ J $= 60$ kJ

A resistive force is one that inhibits or resists the motion of an object. It acts in a direction opposite to any motion or applied force that is trying to move the object.

OR

Minimum power $= \frac{\text{Energyused}}{\text{Timetaken}}$

$= \frac{60{,}000\ J}{\text{Is}}$

60,000 W = 60 W

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

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 accomodated in different zones of pond culture.

(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.