Class IX Science Sample Paper – Set 1

Max. Marks: 80 **Time Allowed: 3 hours**

General Instructions:

1. This question paper consists of 39 questions in 5 sections. Maximum Marks: 80

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.

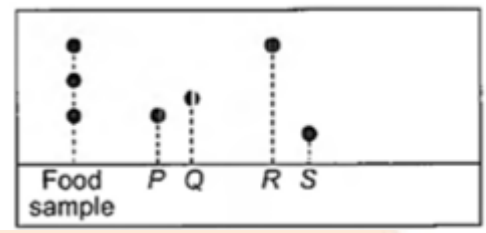
3. Section A consists of 20 objective type questions carrying 1 mark each.

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.

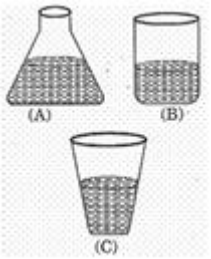
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.

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.

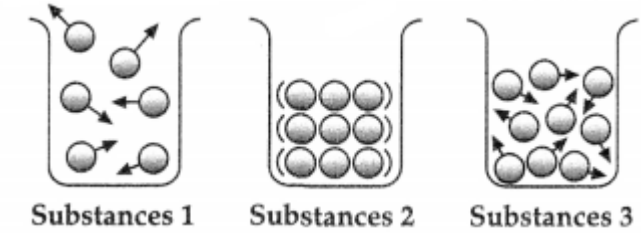
Q. No.	Questions	Marks
1.	Oysters are cultivated in inland water bodies for food. What else can he obtained from the cultivation of oysters? (A) Pearl (B) Sponge (C) Platinum (D) Sand	1
2.	A food sample was tested for the presence of components P, G, R and S and the following chromatogram was obtained.  The components not present in food sample are a) Q and R b) P and Q c) P and R d) Q and S	1

3.	To prepare iron sulphide, by heating a mixture of iron filings and sulphur powder, we should use a: a) copper dish b) china dish c) Watch dish d) watch glass	1
4.	plasmolysis in a plant cell is defined as a) shrinkage of nucleoplasm b) shrinkage of cytoplasm in hypertonic medium c) break down (lysis) of plasma membrane in hypotonic medium d) shrinkage of nucleolus	1
5.	Which of these properties qualifies Amoeba as eukaryote? (A) It is unicellular (B) It needs food for energy (C) It has a membrane-bound nucleus (D) It is surrounded by a plasma membrane	1
6.	The water-conducting tissue generally present in gymnosperm is: (A) Vessels	1

	(B) Sieve tube (C) Tracheids (D) Xylem fibers	
7.	A signal from a space ship reaches the ground in 5 minutes. What was the distance of the space ship from the ground station? The speed of the signal is 3×10^{8} m/s a) 9×10^{7} m b) 9×10^{10} m c) 9×10^{6} m d) 3×10^{6} m	1
8.	Three students used three different containers (A) (B) and (C) of different shapes, for finding the loss in weight of solid when dipped in water. On dipping a solid sphere in these containers they would observe that the loss in weight is:  a) Minimum in [A] b) Maximum in [A]	1

	c) Maximum in [B] d) Same in all	
9.	Smooth muscle consists of _____ filaments that are not arranged into sarcomeres giving it a non-striated pattern. a) plain and large b) curved and large c) thick and thin d) long and straigh	1
10.	The boiling points of diethyl ether, acetone, and n-butyl alcohol are 35°C, 56°C and 118°C, respectively. Which one of the following correctly represents their boiling points in Kelvin scale? (A) 306K,329K,391K (B) 308K,329K,392K (C) 308K,329K,391K (D) 329K,392K,308K	1
11.	Choose the correct statement of the following. (A) Conversion of solid into vapours without passing through the liquid state is called vaporisation. (B) Conversion of solid into vapour without passing through the liquid state is called sublimation. (C) Conversion of vapours into solid without passing through the liquid state is called freezing. (D) Conversion of solid into liquid is called sublimation.	1

12.	The smooth muscle consists of _____. Each fibre contains a single oval nucleus in its thick middle part. The cross-striations are absent so that the fibres look smooth, hence the name unstriated. a) straight, wide unbranched spindle-shaped fibre b) long, narrow unbranched spindle-shaped fibres c) long, narrow unbranched spindle-shaped fibres d) short, wide unbranched spindle-shaped fibres	1
13.	Which of one of the following nutrients is not available in fertilisers. a) Iron b) Potassium c) Nitrogen d) Phosphorou	1
14.	Which of one of the following nutrients is not available in fertilisers. a) Iron b) Potassium c) Nitrogen d) Phosphorou	1
15.	During summer, water kept in an earthen pot becomes cool because of the phenomenon of:	1

	(A) Diffusion (B) Transpiration (C) Osmosis (D) Evaporation	
16.	The picture shows the arrangement of particles in three different substances.  Which of the following is true about the state of the three substances? (A) Substance 1: Solid, Substance 2: Liquid, Substance 3: Gas (B) Substance 1: Gas, Substance 2: Liquid, Substance 3: Solid (C) Substance 1: Liquid, Substance 2: Gas, Substance 3: Solid (D) Substance 1: Gas, Substance 2: Solid, Substance 3: Liquid	1

Assertion-Reason Based Questions

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

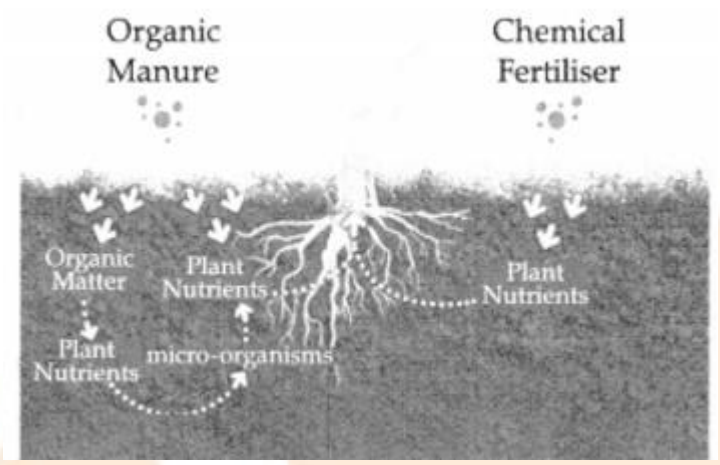
(A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

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

(C) (A) is true but (R) is false.

(D) (A) is false but (R) is true.

17.	Assertion (A): è prefer to wear cotton clothes during summer. Reason (R): Cotton clothes are good absorber of water.	1
18.	Assertion (A): Solids do not diffuse in air. Reason (R): The particles are closely packed in solids.	1
19.	Assertion (A): Particles of gas intermix with each other.' Reason (R): The intermixing of particles of two different types of matter on their own is called diffusion.	1
20.	Assertion (A): Lysosomes are known as suicidal hag of cells. Reason (R): Lysosomes contain powerful enzymes capable of breaking down all organic material.	1
Section – B **(Question No. 21 to 26 arc very short answer questions)**		
21.	The picture shows how organic manure and chemical fertilizer are used by plants.	2

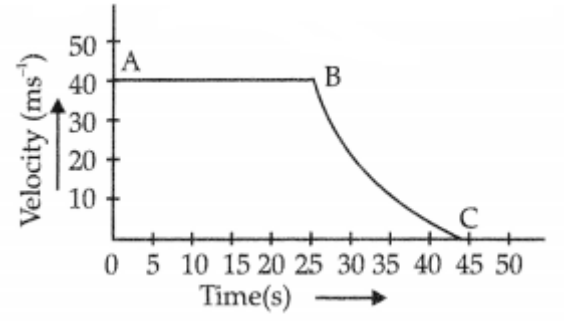
	 (a) Which of the two, organic manure and chemical fertiliser, provides food for the soil microorganism? (b) Which of the two, organic manure and chemical Ierhliser is not harmful for the environment? Why?	
22.	In the oil tankers some space is left at the top while filling them. Explain. OR Explain why some of the leaves may fall from a tree, if we vigorously shake its branch. Nucleus of an atom has positive charge on it. Establish.	2
23.	How will you demonstrate that air contains water vapours?	2
24.	When vertically jerk is given to a string, transerve waves are formed. Give three features of these waves.	2
25.	Distinguish between cell wall and cell membrane.	2

26.	The electronic configuration of an element 'X' is 2, 8, 2. (a) Find the number of electrons present in the atom of element 'X'. (b) Write its atomic number. (c) Is element 'X' a meta I or a non-metal? (d) Find out the valency of the element 'X'.	2
	Section – C	
27.	State the law of inertia. Why do we fall in forward direction if a moving bus stops suddenly and fall in the backward direction if it suddenly accelerates from rest?	3
28.	Name the physical quantities denoted by: (a) the slope of the distance-time graph (b) the area under velocity-time graph (c) the slope of velocity-time graph. Or How can you calculate the magnification of a microscope?	3
29.	(a) Define power. Derive its SI unit. (b) An electric bulb is rated 15 watts. What does it mean? (c) What is the energy consumed in joules if it is used for 10 minutes?	3
30.	Ram's family was worried about heavy electricity bills to be paid. Their neighbour Mohan suggested some easy and effective steps to reduce	3

	the same. Next month's bill came as a relief to Ram, as the consumption of electricity had reduced by 50 units and so had the bill. a. In what other aspects of life can this situation help? b. What is the unit of energy? c. Write any three steps that you think Mohan might have suggested to Ram.	
31.	Draw the graph for uniform retardation a. position - time graph b. velocity - time graph c. Acceleration- time graph Or A particle moves in a circle with O as centre and AO = OB = 5 cm, radius, as shown in the figure. It starts from A. Calculate.  a. the distance covered, and b. the displacement, when it reaches B	3

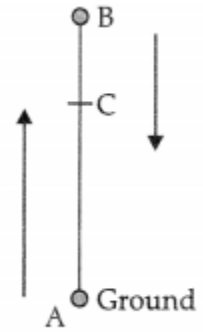
32.	Write three differences between prokaryotic and eukaryotic cells. OR There are. two elements A and B. Find the number of sub-atomic particles in each of these elements. What is the relationship between the two elements?	3
33.	(a) How can we say that sugar is a pure substance whereas milk is not? (b) Which of the following materials fall in the category of a pure substance? (i) Ice (ii) Iron (iii) Wood (iv) Brick	3
	Section D **(Question No. 34 to 36 are long answer questions)**	
34.	(a) Explain the terms: (i) Endocytosis, (ii) Plasmolysis. (b) What wifl happen if the organisation of a cell is damaged due to certain physical or chemical reasons? (c) How do substances like CO_2 and water move in and out of the cell? OR Identify the type of tissues in the following: (a) Vascular bundle (b) Inner lining of the intestine	5

	(c) lining of the kidney tubule (d) Iris of the eye (e) Muscles of the heart	
35	How the water changes into vapours at temperature below its boiling point? List the factors affecting evaporation. Mention two examples from daily life where evaporation causes cooling. OR (a) Explain the term diffusion. Illustrate with an activity that rate of diffusion increases with temperature. (b) Name two compressed gases (i) used in our homes for cooking (ii) supplied to hospital in cylinders.	5
36.	How the water changes into vapours at temperature below its boiling point? List the factors affecting evaporation. Mention two examples from daily life where evaporation causes cooling. OR (a) Explain the term diffusion. Illustrate with an activity that rate of diffusion increases with temperature. (b) Name two compressed gases (i) used in our homes for cooking (ii) supplied to hospital in cylinders.	5
Section E		

37.	Study the following graph and choose the correct options to answer the following questions given below: The velocity-time graph of an object is shown in the following figure.  (a) State the Kind or motion that objects has, from A to B and from B to C. (b) What does the area enclosed by the velocity-time graph represent? (c) Identify the part of graph where the object has zero acceleration. Give reasons for your answer. OR Identify the part of graph where the object has negative acceleration. Give reasons for your answer.	4
38.	The table lists the properties of four substances. |	**Is it shiny?**	**How does it conduct electricity?** | |---|---|---| | Substance 1 | yes | very good | | Substance 2 | no | very poor | | Substance 3 | yes | medium | | Substance 4 | no | poor | (a) Which of the substances is likely to be a metal? (b) Which of the substances is likely to he a metalloid? (c) Which of the substances is/are likely to he a nonmetal? Why?	4
39.	(a) A stone is thrown upwards from a point A, as shown in the figure. After reaching the highest point B it comes down. Explain the	4

transformation of energy from A to B and B to A and also mention the type of energy possessed by the stone at points A, B, and C of its journey.

(b) A body of mass 20 kg is dropped from a height of 101 m. Find its K.E. and PE. after (i) 1st second (ii) 2nd second (iii) 3rd second.



OR

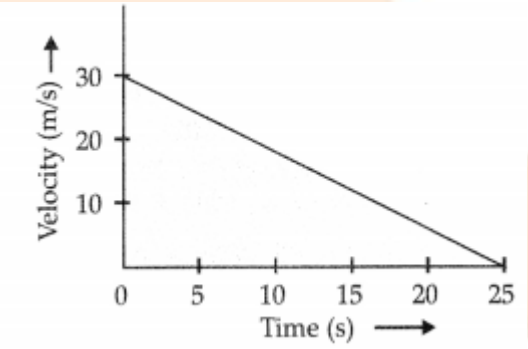
(a) State the law that provides the formula for measuring force and the law which provides the definition of force.

(b) Velocity time graph of a 50 g marble rolling on a floor is given below. Find:

(i) time in which it stops. ‘

(ii) negative acceleration produced on it.

(iii) positive force acting on the marble.



The definition of force is given by Newton’s first law

Answer Key

Section A

1. (A) Pearl

Explanation: Oysters are cultivated for obtaining pearls

2. (d) Q and S

Explanation: Chromatogram of food sample does not match with the chromatograms of components Q and S.

3. (b) china dish

Explanation: China's dish is the right apparatus used for strong heating. So, china's dish is used for heating as it has a high melting point and does not react with sulphur.

4. (b) shrinkage of cytoplasm in hypertonic medium

Explanation: Plasmolysis is mainly known as shrinking of cell membrane in hypertonic solution and great pressure**.**

5. (C) It has a membrane-bound nucleus

Explanation: Amoeba has membrane-bound nucleus which is a characteristic found in eukaryotic cells only.

6. (C) Tracheids

Explanation: Gymnosperms are characterised by the presence of tracheids as their major conducting tissue.

7. b) 9×10^{10} m

8. d) Same in all

Explanation: Loss in weight depends on the liquid density and volume displaced (= volume immersed) and not on the shape of the container.

9. (c) thick and thin

Explanation: Smooth muscle consists of thick and thin filaments that are not arranged into sarcomeres giving it a non-striated pattern.

10. (C) 308K,329K,391K

Explanation: On applying the formula,

T°C + 273 = K,

The boiling point of diethyl ether 35°C + 273 = 308 K

Boiling point of acetone = 56° C + 273 = 329 K

and Boiling point of n-butvl alcohol = 118°C+273 = 391K.

Hence, the correct order of boiling points in Kelvin scale is 308 K, 329 K, and 391 K.

11. (B) Conversion of solid into vapour without passing through the liquid state is called sublimation.

Explanation: The conversion of liquid into gas (vapour) is called vaporisation. The conversion of liquid into solid is called freezing. The conversion of solid into liquid is called melting.

12. (b) long, narrow unbranched spindle-shaped fibres

Explanation: The smooth muscle consists of long, narrow unbranched spindle-shaped fibres. Each fibre contains a single oval nucleus in its thick middle part. The cross-striations are absent so that the fibres look smooth, hence the name unstriated.

13. (a) Iron

Explanation: As iron is a micronutrient that is required mainly for enzyme activity and fertilisers are supplied mainly for replenishing macronutrients which help in plant growth.

14. (a) Iron

Explanation: As iron is a micronutrient that is required mainly for enzyme activity and fertilizers are supplied mainly for replenishing macronutrients which help in plant growth.

15. (D) Evaporation

Explanation: It is because of the phenomenon called evaporation. An earthen pot has a large number of tiny pores in its walls and some of the water molecules continuously keep seeping through these pores to outside the pot. This water evaporates continuously and takes the latent heat required for vaporization from the remaining water. In this way, the remaining water loses heat and gets cooled.

16. (D) Substance 1: Gas, Substance 2: Solid, Substance 3: Liquidis correct
Explanation: In solids, molecules are tightly packed as compared to liquid and gas. Substance 3 is solid as molecules are closely packed. Molecules in liquids are slightly loose while molecules in gases are very loosely packed. Hence, substance 2 is liquid and substance 1 is gas.

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

Explanation: Cotton being good absorber of water helps in absorbing the sweat, which on evaporation gives a cooling sensation in the body.

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

Explanation: The vessel is a long-distance channel for water transport. A Sieve tube is a long-distance channel for the transport of organic nutrients. The wall of the vessel is lignified. Lignification is absent in sieve tubes.

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

Explanation: Particles of a gas are loosely packed. So, they move randomly due to space between them and intermix with other particles present there.

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

Explanation: During the disturbance in cellular metabolism lysosomes may burst and the enzymes digest their own cell. Therefore, lysosomes are also known as suicidal bags. Lysosomes are able to do this because they contain powerful enzymes capable of breaking down all organic material.

Section B

21. (a) Organic manure
(b) Organic manure is not harmful for the environment as it is biodegradable.

22. When the standing tanker suddenly picks up speed, the oil in it on account of inertia of rest tends to continue in its state of rest. Thus, in a way oil is left behind and, hence, exerts very large force on its rear wall. Conversely, when the moving tanker suddenly stops, the oil in it continues moving forward and, hence exerts a very large force on the front wall. These forces can crack the walls of the oil tanker. Therefore to avoid such a mis-hap, some space is left at the top of the tanker for the free movement of oil.

OR

When the branch is, suddenly set in motion, the leaves attached to it tend to continue in their state of rest, on account of inertia of motion. Thus a lot of strain acts on the junction of the

leaves and the branches. Due to this strain the weakly held leaves are left behind and, hence fall off the branch.

23. Thoroughly dry a glass beaker and take some crushed ice in it. After sometime, droplets of water appear on the outer surface of glass. It is because of water vapours present in air, which get condensed when they come in contact with the glass surface where the temperature is very low.

24. Three features of transverse waves are:

i. The particles of the medium vibrate at right angles to the direction of propagation of the wave.

ii. Transverse waves travel in the form of crests and troughs.

iii. They cannot travel through a vacuum.

25. Differences between cell wall and cell membrane:

Cell wall	**Cell membrane**
(1) It is present only in plant cells.	It occurs both in animal cells and plant cells.
(2) It is dead in nature and permeable.	It is a living membrane and is semi-permeable.

26.

(a) 12

(b) Atomic number = 12

(c) "X' is a metal as it has two outer electrons that it can bosse quickly.

(d) Valency of T is + 2.

Section C

27.

Law of inertia: An object remains in its state of rest or of uniform motion in a straight line until an external unbalanced force acts on it. When a moving bus stops suddenly, the bus slows down but our body tends to remain in the state of motion due to inertia of motion, Sudden start of bus brings motion to the bus as well as our feet but rest of the body still has inertia of rest due to which we fall backward.

28.

(a) Speed
(b) Displacement
(c) Acceleration

Or

Mangnification of a microscope is calculated by multiplying the powers of eyepiece and objective lenses. Mathematically, M= P_1 x P_2 , where P1 is the power of eyepiece and P2 is the power of objective.

29.

(a) Power is the rate of doing work. 1

Power = $(\frac{\text{Work}}{\text{Time}} = \frac{1 \text{ Joule}}{1 \text{ second}})$ 1 watt or 1 W

(b) If the power of an electric bulb is 15 W it consumes 15 Joules of energy per second.

(c) Energy consumed by the bulb in 10 minutes 15 W x 600s = 9000 Joules

30.

a. Promotes saving habits and judicial uses of resources and save resources

b. Joule.

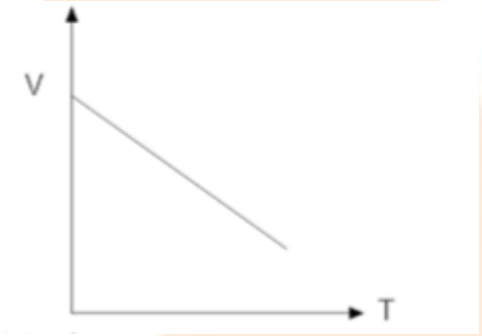
c.

- Switch off the power where it is not need.
- Use of CFL light.
- To check the proper wiring as to avoid leakage of power.

31.

(a)

(b)



C)

Or

a. Distance covered = $\pi \times OA = \pi \times 5 = 5\pi cm$

b. Displacement ==$2 \times OB = 2 \times 5 = 10cm$ along AB

32.

Differences between prokaryotic and eukaryotic cells:

Prokaryotic cell	**Eukaryotic cell**
(1) Size: Generally small (1 – 10 µm) $1\mu m = 10^{-6}$ m.	Size: Generally large (5-100 µm)
(2) Nuclear region: Contains only nucleic acid and is undefined due to the absence of nuclear membrane and is known as nucleoid.	Nuclear region: Well-defined and surrounded by a nuclear membrane.

(3) Membrane-bound cell organelles absent.	Membrane-bound cell organelles (e.g., chloroplasts, Golgi bodies, etc.) present.

OR

A_{13}^{26} electrons = 13 protons + 13 neutrons
Atomic number = 26-13 13
B_{14}^{26} electrons = 14 protons + 12 neutrons
Atomic number = 26- 12 = 14
They are isobars.
Isobars are any member of a group of atomic or nuclear species all of which have the same mass number and have different atomic numbers.

33.

(a) Sugar is a pure substance because it cannot be separated and is formed of only single type of molecule. In the case of milk, it can be separated by physical process into its components. It has components like water, fat and proteins, etc.

(b) Ice and iron are pure substances as they contain particles of only one kind of matter while wood and brick contain more than one kind of matter.

Section D

34.

(a)
(i) Endocytosis: The flexibility of the cell membrane enables the cell to engulf food and other materials from its external
environment. Such process is known as endocytosis.

(ii) Plasmolysis: When a living plant cell loses water through osmosis, there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.

(b) When the organisation of a cell gets damaged, lysosomes will burst and their enzymes will eat up their own cell organelles. Therefore, lysosomes arc also known as the “suicidal bags of the cell”.

(c) Gases like CO_2 and O_2 move in and out of the cell by diffusion from their higher concentration to lower concentration. Water enters the cell by endosmosis through a semi-permeable plasma membrane from its higher concentration to its lower concentration. Similarly, water moves out of the cell by exosmosis when a cell is placed in a hypertonic solution.

OR

- Complex tissues
- Columnar epithelium
- Cuboidal epithelium
- Involuntary muscular tissues
- Cardiac muscles

35.

The phenomenon of change of a liquid into vapour at a temperature below its boiling point is called evaporation. Fractions of particles at the surface having higher kinetic energy, are able to break away from the forces of attraction of other particles and get converted into vapour.

Factors which affect rate of evaporation:

- Surface area
- Temperature
- Humidity
- Wind speed

Two examples from daily life where evaporation causes cooling:
Sprinkling of water on the roof, cooling of water kept in earthen pots, etc.

OR

(a) Diffusion is the process resulting from random motion of molecules by which there is a net flow of matter from a region of high concentration to a region of low concentration. During diffusion particles of one substance occupy the vacant space present between the particles of the other substance.

Activity:

- Take 5 g of copper sulphate each in three beakers.
- Pour 100 ml of distilled water slowly in one of the beakers.
- Cover this beaker with a watch glass.
- Pour 100 mi of cold cater in the second beaker slowly.
- Place the third beaker containing 100 ml of water on a tripod stand for heating.
- Observe the diffusion process which begins in all the beakers.
- Record the time taken for the dissolution of copper sulphate in all the three cases.

Conclusion: The rate of diffusion of copper sulphate in water is in the order:
Beaker 3> Beaker 2> Beaker 1.
It illustrates with that rate of ditfusion increases with increase in temperature.

(b) Gas used in our home for cooking:

- liquified Petroleum Gas (LPG) Gas supplied to hospital in cylinder:
- Oxygen.

36.

(a) Two ways by which we can change a saturated solution to unsaturated solution are:

- By increasing the temperature/by heating the solution.
- By increasing the amount of solvent.

Homogeneous Mixture	Heterogeneous Mixture
(i) Uniform composition.	Non-uniform composition.
(ii) No distinct boundaries of separation. e.g., sugar ± water.	Distinct boundaries of separation. e.g. sand + water.

OR

When a solid melts the temperature of the system does not change after the melting point is reached even when we continue to supply heat because the supplied heat energy gets used up in changing the state by' overcoming the forces of attraction between the particles. This is called latent heat.

Latent heat of vaporisation: The amount of heat energy that is required to change 1 L of a liquid into gas at atmospheric pressure at its boiling point. Steam will give more severe burns because particles of steam have extra energy in the form of latent heat of vaporisation.

Section E

37.

(a) Uniform motion from A to B and non-uniform motion from B to C.

(b) Displacement

(c) AB because velocity remains constant from A to B.

OR

BC because velocity decreases from B to C.

38.

(a) Substance 1, as it is shiny and conducts electricity very well.
(b) Substance 3 1
(c) Substance 2/suhstance 4, as not shiny and poor conductor ol electricity.

OR

No, substance 2 or substance 4 cannot be used to prepare electric circuit wires as they are bad conductors of electricity.

39.

(a) While going up, K.E → P.E. and while coming down P.E. → K.E.
At A → K.E
B → P.E.
C →K.E + P.E

(b) Total Energy = mgh
$= 20 \times 10 \times 100$
$= 2 \times 10^4$ J

(i) After 1st" second:
$v = u + gt = 10 \times 1$
= 10 m/s (u =0)

K.E. = $(\frac{1}{2})$

$= (\frac{1}{2} \times 20 \times 10 \times 10)$

= 1000 J

P.E = T.E. – K.E = 20,000-l000
=19,000 J

(ii) After 2nd second:
$\nu = 20\ ms^{-1}$,
K.E. = $(\frac{1}{2}mv^2 = \frac{1}{2} \times 20 \times 20 \times 20\ )$
= 4,000 J

P.E. = T.E. – K.E.
= 20,000 – 4,000 = 16,000 J

(iii) After 3rd second:
$\nu = 30ms^{-1}$
K.E. = $(\frac{1}{2} \times 20 \times 30 \times 30\ )$
= 9,000 J

PE. = T.E. – K.E.
= 20,000- 9,000 = 11,000 J

OR

(a) Formula for measuring force is given by Newton's 2nd law. It states that the rate of change of momentum of an object is directly proportional to the force applied and takes place in the sanie direction as that of the force. Second law of motion gives us a method to measure the force acting on an object as force is the product of its mass and acceleration.

Definition of force is given by Newton's first las it states that an obect continues to be in a state of rest or a body in motion will remain in uniform motion along a straight line unless acted upon by an unbalanced force.

(b) From graph

(i) t =25s

(ii) a = $(\frac{(30-0)}{25})$ = 1.2 m/s^2

(iii) F =ma

= $\left(\frac{50}{1000}\right) \times 1.2 = 0.06$ N