TOPPER SAMPLE PAPER - I
SUMMATIVE ASSESSMENT TEST

Class IX: SCIENCE
Questions

Maximum Marks: 80   **Time: 3-3½ Hours**

1. Questions 1 to 5 are one mark questions. They are to be answered in one word or one sentence.
2. Questions 6 to 14 are two marks questions. They are to be answered in about 30 words.
3. Questions 15 to 23 are three marks questions. They are to be answered in about 50 words.
4. Questions 24 to 26 are five marks questions. They are to be answered in about 70 words.
5. Questions 27 to 41 are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four options: a, b, c and d provided to you.

Q 1. What is the function of aerenchyma in aquatic plants?

Q 2. Derive the formula of aluminium oxide.

Q 3. If an atom contains one electron and one proton, will it carry any charge or not? Give reason.

Q 4. Can we hear the ringing of a mobile phone placed in a vacuum chamber?

Q 5. What are infrasonic waves?

Q 6. a) Name two ways of improving crop varieties.

b) Why is nitrogen referred to as a macronutrient of plants?

Q 7. Identify the tissue and state its function in each of the following instances:

  i)   Tissue composed of sieve tubes, companion cells, parenchyma and fibres.

  ii)   Hard tissue with thick lignin deposition in cell walls.

Q 8. Which disease out of the following has the maximum chance to spread in a fully packed theatre from a sick person? Why?

Pneumonia, cholera, syphilis

Q 9.

   a. Which of the following will scatter light: a salt solution or a soap solution? Why?

   b. What happens when a hot saturated solution is cooled?

Q 10. Give two points of difference between homogeneous and heterogeneous mixture.

Q 11. What are isotopes? Give an example.

Q 12. What is the force of attraction between two bodies of mass 10 kg and 20 kg separated by a distance of 10 meters? ($G = 6.673 \times 10^{-11}$ Nm^2kg^{-2})

Q 13. Ram throws a stone in the pond. It displaced 1.5 kg of water. Calculate the buoyant force acting on the stone. ($g = 9.8$ m/s^2)

Q 14. Two objects of unequal masses possess the same momentum. Which of the two objects will have greater kinetic energy?

Q 15. Diagrammatically represent the packaging animal connective tissue and label the following parts – the 2 types of fibres present in the matrix and any 2 types of cells.

Q 16. Name the following:

   i)   The scientific management of animal livestock

   ii)   Method of obtaining fish from natural resources

   iii)   Poultry reared for obtaining meat

   iv)   Cultivation of bees on a commercial scale for the production of honey and beeswax

   v)   The growing of different crops on a piece of land in a pre-planned succession.

   vi)   Compost prepared by using earthworms to hasten the decomposition process of plant and animal refuse

Q 17. i) A boy recovered from chicken pox infection recently. Should he now be vaccinated against chicken pox? Why?

ii) Why is it difficult to make anti-viral medicines?

Q 18.
a. A substance X on heating gives Y and Z. What is X - an element, a compound or a mixture?
b. Name the process will you use to separate a mixture of naphthalene and salt? Why?

Q 19. Calculate:
a. The number of molecules of sulphur (S_8) in 16g of solid sulphur. (Given :Molar mass of S_8 = 256 g/mol)
b. Number of moles in 20g of water. (Given: Atomic mass of H = 1, O = 16)

Q 20.
a. Define atomicity? Write the atomicity of the elements phosphorus and helium?
b. State the postulate of Dalton's atomic theory which is the result of law of conservation of mass?

Q 21. State the conditions under which the object will float? Ships are made of iron and steel even then they float on water. Why?

Q 22. Ram uses a 100 watt bulb for 10 hrs, a 150 watt fan for 10 hrs and 200 watt computer for 4 hours. Calculate his monthly usage of electricity.

Q 23. A car with a speed of 25m/s weighing 900 Kg stops at a distance of 40 metres. Calculate the work done by the brakes.

Q 24. i) Identify and give one important function of the organelles marked A, B and C in the following figure.
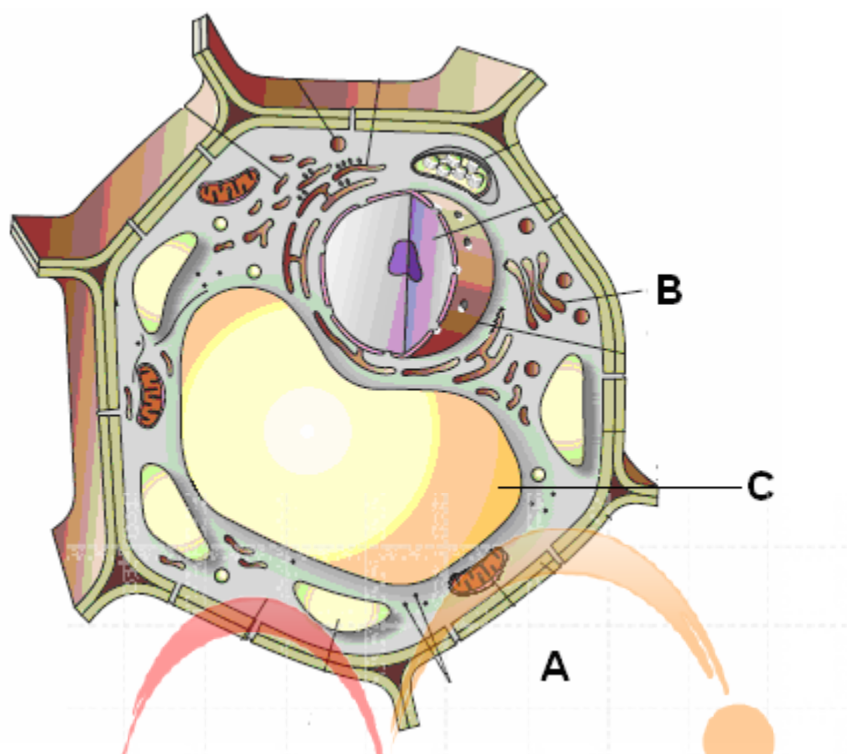
ii) Give two differences between chloroplasts and leucoplasts.

Q 25.
   a. What is the relation between - $^{40}_{18}Ar$ and $^{40}_{20}Ca$
   b. Calculate the number of protons, electrons and neutrons in Ar and Ca.
   c. Write the electronic configuration of Ar and Ca.

Q 26. a) Ultrasound waves are extensively used in industries. Give two examples.
b) Two children are at the opposite end of an iron pipe. One strikes the end of the pipe with a stone. Calculate the ratio of the time taken by the sound waves through air and iron to reach the other child.
Use speed of sound in (i) air = 344 m/s and (ii) iron = 5130 m/s.

Q 27. In which of the mixture, the heavier particles will settle at the bottom:
   a. Common salt and water
   b. Starch and water
   c. Alum and water
   d. Chalk powder and water

Q 28. How would you separate sulphur from a mixture of sulphur and iron fillings?
   a. By filtration
   b. By distillation
   c. By chromatography
   d. By differential extraction using CS_2

Q 29. In the reaction of zinc and dilute sulphuric acid, which gas is formed?
   a. Oxygen
   b. Sulphur dioxide
   c. Hydrogen
   d. Carbon dioxide

Q 30. Which processes would you use to separate salt, sand and iron fillings?
   a. Dissolving and filtration
   b. Use of magnet, dissolving and filtration
   c. Use of magnet, dissolving, filtration and evaporation
   d. Use of magnet, filtration and distillation

Q 31. To determine the boiling point of water, pieces of pumice stone should be added to water before heating:
   a. To avoid bumping
   b. Because the boiling point of water is very low
   c. Because water is an ionic compound
   d. To stop the conversion of water to hydrogen and oxygen

**Q 32.** Given below are the steps in the preparation of a temporary mount of a stained
onion peel.

(i) Cover the material with the cover slip.
(ii) Transfer the stained peel to the clean glass slide and add a drop of glycerine.
(iii) Remove the peel from the concave side of the onion.
(iv) Drop it in the water in a petri dish and add a drop of safranin stain.
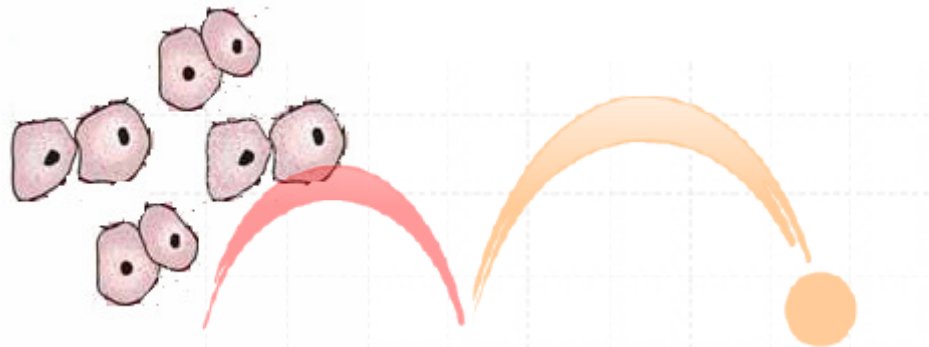
The correct sequence of steps is
(a) (iii), (iv), (ii), (i).
(b) (i), (ii), (iii), (iv).
(c) (ii), (iii), (iv), (i).
(d) (iii), (iv), (i), (ii).

Q 33. Out of the following 4 figures, which represents the correct figure of parenchyma tissue as observed under the microscope?
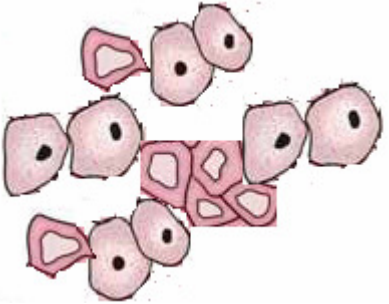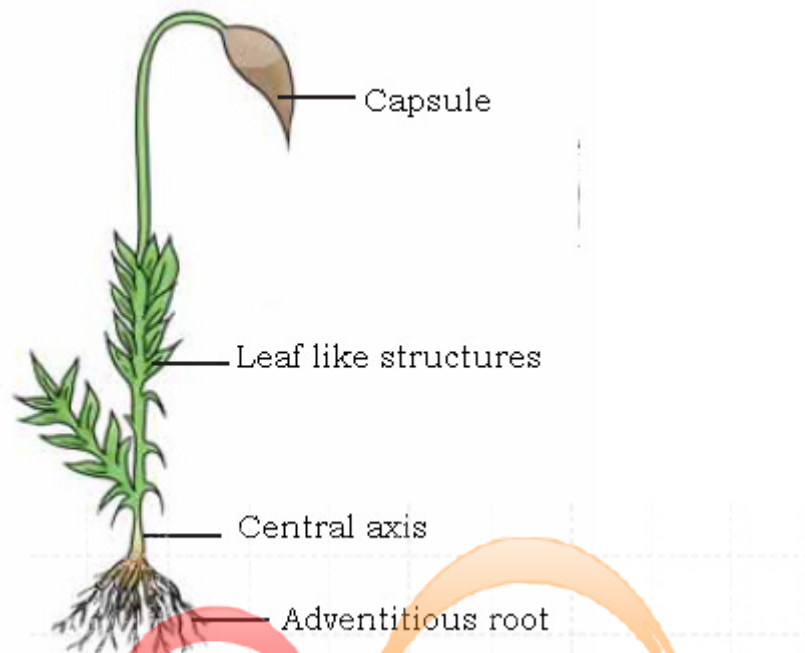
a)
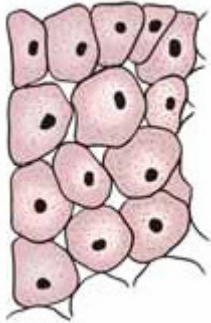
b)

c)

d)

Q 34. Satish drew the following labeled figure of moss in his book. Identify the incorrect part in the diagram.

a) There is no capsule found in moss.

b) The region marked adventitious root should be labeled as rhizoids.

c) Flowers borne on moss are not shown in the figure.

d) Leaves are shown as green in colour; they should be brown.

Q 35. Given below are figures of leech and earthworm. Which common feature assigns them to the same phylum?
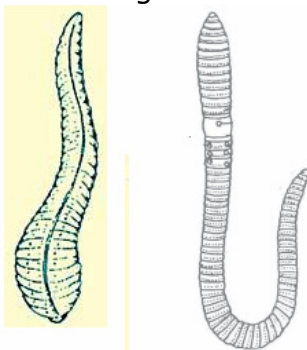
a) Clitellum

b) Moist skin

c) Metameres

d) Tapering body

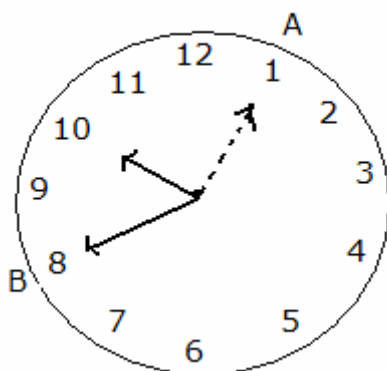**Q 36.** The initial (A) and final (B) readings on a stop clock for 7 oscillations of a simple pendulum are shown in the figure given below. The time period of simple pendulum is

a) 1 s   b) 8 s   c) 5 s   d) 7 s


Q 37. The mass of a solid iron cube of side 4 cm is to be determined. Of the four spring balances available, the one best suited for this purpose would have

a) Range = 0 to 100g, and the least count = 1 g

b) Range = 0 to 100g, and the least count = 5 g

c) Range = 0 to 1000g, and the least count = 10 g

d) Range = 0 to 1000g, and the least count = 25 g

Q 38. In an experiment to establish the relation between loss in weight of an immersed solid with the weight of water displaced by it, the correct set up is shown in the figure
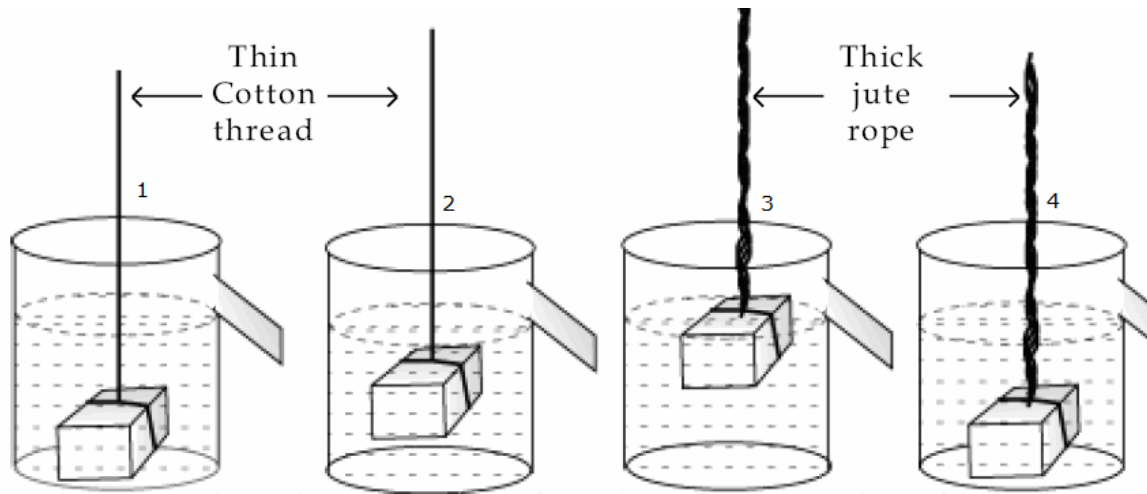
a) 1   b) 2   c) 3   d) 4

Q 39. A common substance used as an adulterant in turmeric powder is:
   a. Horse dung
   b. Lead chromate
   c. Metanil yellow
   d. Starch

Q 40. For simple pendulum shown in the figure, the effective length is
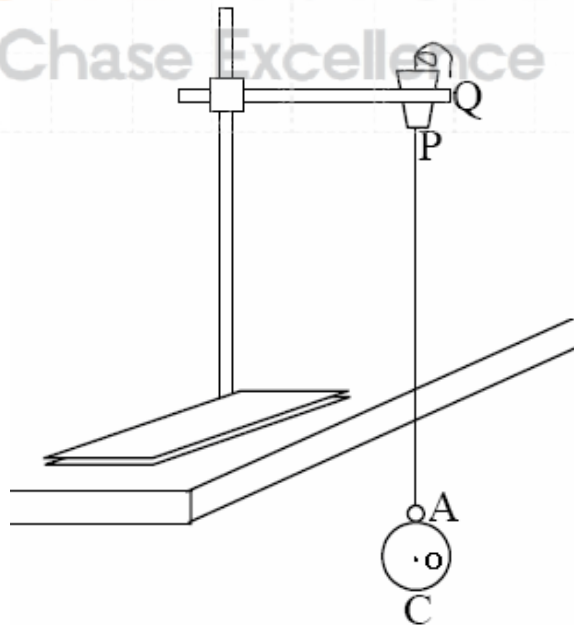
a) AP   b) CP   c) OP   d) CQ

Q 41. The observations, on the experiment of studying temperature – time graph, reported by two students X and Y are provided in the given table. The experiment is likely to have been performed correctly by

Time (min)	Temp (ºC) Student X	observed by Student Y
0	61.0	61.0
2	60.5	59.0
4	60.0	58.0
6	59.0	57.5
8	58.0	57.0
10	56.5	56.5
12	54.0	56.0

a) X   b) Y   c) Both X and Y   d) Neither X nor Y

Class IX: SCIENCE

Solutions

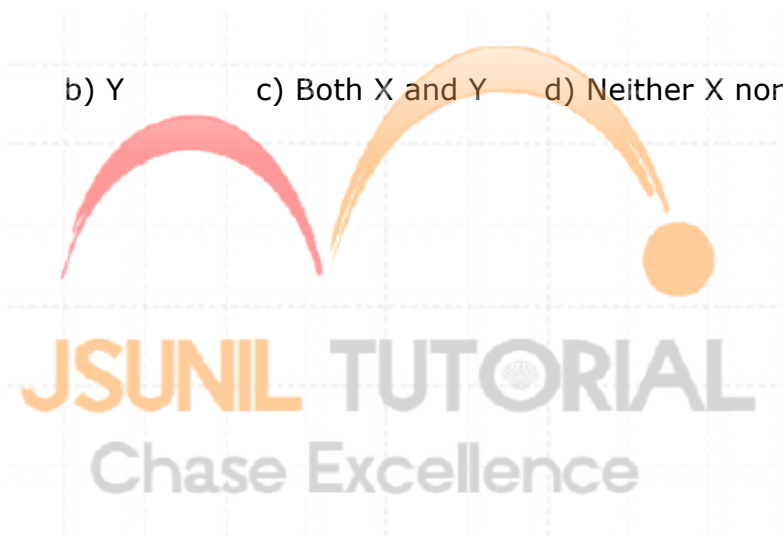**Ans 1.** Aerenchyma gives buoyancy to the aquatic plants and thus helps them to float.   **(1)**

Ans 2. The formula of aluminium oxide is Al_2O_3.

Symbol: Al   O

Charge: 3+   2-   (1/2)

Formula: Al_2O_3 (1/2)
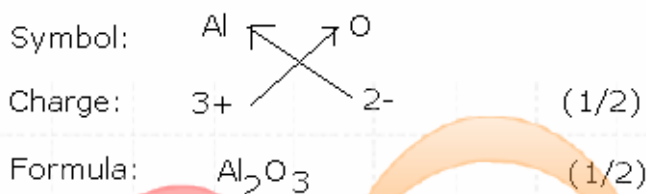
Ans 3. If an atom contains one electron and one proton it will not carry any charge.   (1/2)
Because the positive charge on the proton neutralises the negative charge on the electron.   (1/2)

Ans 4. No, since sound waves needs a medium to travel.   (1)

Ans 5. The sound waves of frequencies below the audible range (20 Hz-20000 Hz) are called infrasonic waves.   (1)

Ans 6. a) Hybridisation and genetic modification are two ways of improving crop varieties.
b) Among the nutrients supplied by soil, nitrogen is needed in large quantities by the plant and hence it is referred to a macronutrient.
                                                                                     (1+1)

Ans 7. i) Phloem. It transports food from leaves to other parts of the plant.   (½ +½)
ii) Sclerenchyma. It provides mechanical strength to the plant parts.
                                                                                     (½ +½)

Ans 8. Pneumonia   (½)

Pneumonia is an air-transmitted disease. Such diseases are easier to
catch the closer we are to an infected person.   (½)

In closed areas like theatres, the droplet nuclei thrown out by an infected
person recirculate and pose a risk to everybody.   (1)

Ans 9.
   a. A soap solution will scatter light because it is a colloid. (1/2 + 1/2)
   b. Crystals of solute /solid solute gets separated.   (1)

Ans 10.

Homogeneous mixture	Heterogeneous mixture
It has a uniform composition. (1/2)	It has a non - uniform composition. (1/2)
Example: sugar solution (Or any other example) (1/2)	Example: mixture of sand and sugar (Or any other example) (1/2)

(Or any other point of difference)

Ans 11. Isotopes are the atoms of the same element having the same
atomic number but different mass number.   (1)

Example: $_1^1H$ and $_1^2H$ (1)

Ans 12. According to the universal law of gravitation,

$$F = \frac{GMm}{r^2}$$ (1)

Therefore,

$$F = \frac{6.673 \times 10^{-11} \times 10 \times 20}{10^2}$$ (1)

$$F = 1.3 \times 10^{-10} N$$

Ans 13. Mass of water displaced by the stone, m = 1.5 kg

We know,

Weight = Mass x Acceleration due to gravity

$\dfrac{1}{2}$

= m x g

Weight of the stone = 1.5 x 9.8 N = 14.7 N

$\dfrac{1}{2}$

In accordance with Archimedes Principle, When an object is wholly or partially immersed in a liquid, it experiences a buoyant force or up thrust which is equal to the weight of liquid displaced by the object.

$\dfrac{1}{2}$

The buoyant force acting on the stone is 14.7 N.

$\dfrac{1}{2}$

Ans 14. Since kinetic energy, $k = \dfrac{p^2}{2m}$

For first object having mass m_1 and momentum p

Kinetic energy, $k_1 = \dfrac{p^2}{2m_1}$

$\dfrac{1}{2}$

For second object having mass m_2 and momentum p

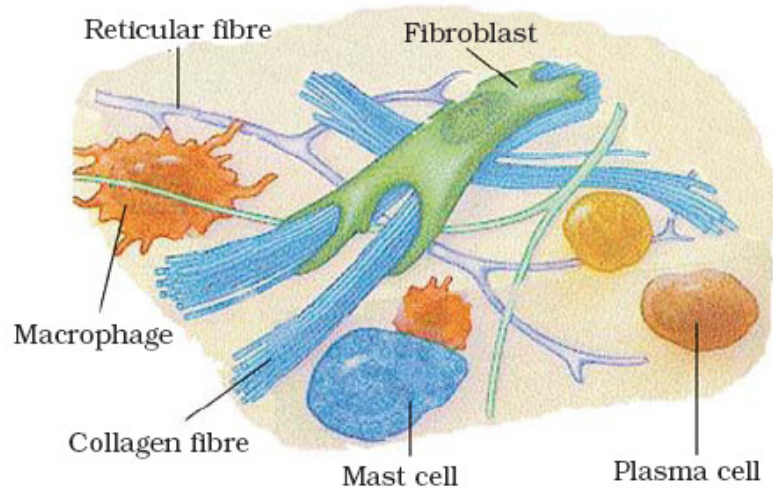Kinetic energy, $k_2 = \dfrac{p^2}{2m_2}$

$\dfrac{1}{2}$

As momentum of both objects are same, then

$$2m_1 k_1 = 2m_2 k_2$$

$$k\alpha \dfrac{1}{m}$$

$\dfrac{1}{2}$

Thus, the heavier body will possess less kinetic energy.

$\dfrac{1}{2}$

Ans 15.

(1 mark for figure)
Labels:
Two types of fibres: Collagen fibre - ½ mark,   Reticular fibre - ½ mark
Any 2 types of cells: macrophage, mast cell, plasma cell and fibroblast – (½ + ½ = 1 mark)

Ans 16.

i) Animal husbandry

ii) Capture fishing

iii) Broiler

iv) Bee-keeping

v) Crop rotation

vi) Vermi-compost

(½ × 6 =3)

Ans 17. i) No.   (1/2)
This is because the boy has already been exposed to the chicken pox virus during the infection and his body has become immune to chicken pox. (1)

ii)   Viruses have few biochemical mechanisms of their own. They use our cellular machinery for carrying out their life processes. Hence there are relatively few virus-specific targets to aim at.
So it is difficult to make anti-viral medicines. (1½)

Ans 18:
  a. Substance X is a compound.   (1)
  b. We will use sublimation to separate a mixture of naphthalene and salt.
                                                                                (1)
   This is because naphthalene on heating changes from solid state directly to gaseous state i.e. it undergoes sublimation. But salt does not undergo sublimation.   (1)

Ans 19:
a.

1 mole of S_8 = Molar mass of S_8 = 6.022×10^{23} molecules $\left(\dfrac{1}{2}\right)$

256 g of S_8 = 6.022×10^{23} molecules

$\therefore$ 16 g of S_8 = $\dfrac{6.022 \times 10^{23} \times 16 \text{ molecules}}{256}$ $\left(\dfrac{1}{2}\right)$

= 3.76×10^{22} molecules

Therefore , 16 g of S_8 contains 3.76×10^{22} molecules. $\left(\dfrac{1}{2}\right)$

b.

Molar mass of water (H_2O)
= 2 x Atomic mass of H + 1 x Atomic mass of O
= 2 x 1 + 1×16
= 18 g $\left(\dfrac{1}{2}\right)$

18 g of H_2O = 1 mole of H_2O $\left(\dfrac{1}{2}\right)$

$\therefore$ 20 g of H_2O = $\dfrac{20}{18}$ = 1.11 mole $\left(\dfrac{1}{2}\right)$

Ans 20.

    a. The number of atoms constituting a molecule is known as its
       atomicity.   (1)

       Atomicity of phosphorus = 4 $\left(\dfrac{1}{2}\right)$

       Atomicity of helium = 1 $\left(\dfrac{1}{2}\right)$

    b. Atoms are indivisible particles, which cannot be created or
       destroyed in a chemical reaction.   (1)

Ans 21. An object will float in a liquid:

(a) if its density is less than that of liquid

(b) if its density is equal to the density of the liquid   (1)

A ship is made up of iron but is not a solid block of iron, it is filled with air spaces. Air has density lower than that of water. Hence due to presence of air the density of ship becomes less than that of water and hence floats on water.   (2)

Ans 22. Power of bulb = 100/1000= 0.10 kw

Power of fan = 150/1000 = 0.15 kw

Power of computer = 250/1000= 0.25 kw   (1)

Energy consumed = power x time

Energy consumed by bulb = 0.10 x 10 = 1 kw-hr

Energy consumed by fan = 0.15 x 10 =1.5 kw-hr

Energy consumed by computer = 0.25 x 4 = 1 kw-hr   (1)

Ram's daily electricity units consumed = 1 + 1.5 + 1 = 3.5 kw-hr

So his monthly consumption would be 3.5 x 30 = 105 kw-hr   (1)

Ans 23. Given: initial speed, u = 25 m/s; final speed, v = 0 m/s;

Distance, s = 40 m; acceleration, a = ?

According to equation of motion,

$$v^2 = u^2 + 2\,a\,s$$

$$(0)^2 = (25)^2 + 2 \times a \times 40$$

$$a = 7.8 \text{ m/s}^2 \hspace{4cm} (1)$$

The force exerted, F = m a = 900 x 7.8 = 7020 N (1)

Therefore, work done, W = 7020 x 40 = 280800 J (1)

Ans 24.
  i) A – Mitochondria – They are the powerhouses of the cell, providing energy for various cellular activities. (½ + ½)

      B – Golgi apparatus – They are involved in the storage, modification and packaging of products in vesicles. (½ + ½)
      C – Vacuole – They are the storage sacs for liquid or solid contents and provide rigidity and turgidity to the cell. (½ + ½)

  ii)

	Chloroplast	Leucoplast
1	They are green coloured plastids	They are white or colourless plastids
2	They are essential to carry out photosynthesis in plants.	Leucoplasts store materials such as starch, oils and protein granules.

(1+1)

Ans 25.
  a. They are isobars. (1)
  b. For Ar:
     Atomic number = 18
     Mass number = 40

     Number of protons = 18 $\left(\dfrac{1}{2}\right)$

     Number of electrons = 18 $\left(\dfrac{1}{2}\right)$

Number of neutrons = 40 - 18 =22 $\left(\dfrac{1}{2}\right)$

For Ca:
Atomic number = 20
Mass number = 40

Number of protons = 20 $\left(\dfrac{1}{2}\right)$

Number of electrons = 20 $\left(\dfrac{1}{2}\right)$

Number of neutrons = 40- 20 =20 $\left(\dfrac{1}{2}\right)$

c. Electronic configuration of Ar = 2, 8, 8 $\left(\dfrac{1}{2}\right)$

Electronic configuration of Ca = 2,8,8,2 $\left(\dfrac{1}{2}\right)$

Ans 26. a) Ultrasound can be used for various commercial uses which are

as follows:

1) Ultrasound is used in industry for detecting flaws (cracks, etc) in metal

blocks. If there is a crack in metal block then ultrasounds get reflected

and do not reach the ultrasound detector.

2) Ultrasound is used in medical industry to investigate internal organs of

the human body such as liver, gall bladder, uterus, kidneys, pancreas,

heart etc.

3) Ultrasounds is also used to remove kidney stones by first breaking

the kidney stones which then could pass through urine.

4) Ultrasound is used extensively to see the well being of foetus (unborn

child) inside the mother's uterus.

5) Ultrasound is used in sonar apparatus to measure depth of sea and to

locate objects under sea like shipwrecks, submarines, sea rocks, hidden

ice-bergs etc.   (Any two points: 1 mark for each point)

b) Given: v_1 (in air) = 344 m/s, v_2 (in iron) = 5130 m/s

Let l be the length of the pipe and t_1 and t_2 are time taken by sound in air and in iron respectively to reach the other end of the pipe.

(1)

$$t = \frac{\ell}{v}$$

$$\therefore t_1 = \frac{\ell}{v_1} = \frac{\ell}{344}$$

$$\text{and } t_2 = \frac{\ell}{v_2} = \frac{\ell}{5130}$$

(1)

$$\text{Ratio} \frac{t_1(\text{in air})}{t_2(\text{in iron})} = (\frac{\ell}{344})/(\frac{\ell}{5130}) = 14.9$$

(1)

Ans 27. d. Chalk powder and water (1)

Ans 28. d. By differential extraction using CS_2 (1)

Ans 29. c. Hydrogen (1)

Ans 30. c. Use of magnet, dissolving, filtration and evaporation (1)

Ans 31. a. To avoid bumping (1)

Ans 32. a) The sequence of steps as given in option (a) is important to get the best stained material for the temporary mount.

(1)

Ans 33. a)
Parenchyma cells are living cells with very thin walls, loosely arranged in most cases with intercellular spaces between them. The cells are all in contact with each other. (1)

Ans 34. b)
Roots are absent in moss. Instead rhizoids are present. (1)

Ans 35. c)
They belong to phylum Annelida, the characteristic feature of which is the presence of distinct annular segments or metameres on body surface. (1)

Ans 36. c Time period = $\dfrac{Total\,time}{Total\,number\,of\,oscillations}$ (1)

Ans 37. c. We must have a smaller least count. We must have a rough estimate of the measurement to be taken to select the range.   (1)

Ans 38. b The solid must be suspended by an inextensible string in the centre without touching its bottom.   (1)

Ans 39. b. Lead chromate   (1)

Ans 40. c The length of the pendulum equals the length from the bottom of the suspension to the centre of the bob.   (1)

Ans 41. b The rate of fall temperature is faster first and slower later. (1)