CBSE
Class IX Science
Term 1
Sample Paper

Time: 3 hrs   **Total Marks: 90**

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
2. All questions are compulsory.
3. All questions of **Section A** and all questions of **Section B** are to be attempted separately.
4. Question numbers **1 to 3** in **Section A** are **one mark** questions. These are to be answered in **one word** or in **one sentence**.
5. Question numbers **4 to 6** in **Section A** are **two marks** questions. These are to be answered in about **30 words** each.
6. Question numbers **7 to 18** in **Section A** are **three marks** questions. These are to be answered in about **50 words** each.
7. Question numbers **19 to 24** in **Section A** are **five marks** questions. These are to be answered in about **70 words** each.
8. Question numbers **25 to 33** in **Section B** are multiple choice questions based on practical skills. Each question is a **one mark** question. You are to select one most appropriate response out of the four provided to you.
9. Question numbers **34 to 36** in **Section B** are questions based on practical skills and are **two marks** questions.

SECTION A

Q. 1 Lysosomes are known as the suicide bags of the cell. Give reason. (1)

Q. 2 The rate of evaporation of a liquid increases on heating. Explain. (1)

Q. 3 Name the physical quantity whose unit is (1)
    (i) $kgms^{-2}$ and
    (ii) Nm^2kg^{-2}

Q. 4 Explain how during the burning of a candle, both physical and chemical changes take place. (2)

Q. 5 It is difficult to balance our body when we accidentally slip on a peel of banana. Explain why. (2)

Q. 6 List the two types of food requirements of dairy animals. (2)

Q. 7 Give any three distinguishing characters of collenchyma and parenchyma. (3)

Q. 8 A gas jar containing air is upside down on a gas jar of bromine vapour. It is observed that after some time, the gas jar containing air also becomes completely reddish brown. (3)
(i) Explain why this happens.
(ii) Name the process involved.

Q. 9 With the help of a labelled diagram, describe in brief an activity to show sublimation of ammonium chloride. (3)

Q. 10 Cough syrup is a common medicine used in cold and cough. It contains alcohol (ethanol) as one of its constituents. Some of the people use it as an alternative of wine. (3)
(i) What should the government do to prevent the misuse of such medicines?
(ii) Which is the most common method for expressing the concentration of a solution?
(iii) If 300 g of cough syrup contains 30 g glucose and 15 g alcohol, what is the concentration in the solution?

Q. 11 Give two examples of each of the following:
(i) Colloids
(ii) Suspension
(iii) True solution (3)

Q. 12 Starting from a stationary position, Rehan paddles his bicycle to attain a velocity of 6 m/s in 30 s. Then he applies brakes such that the velocity of the bicycle comes down to 4m/s in the next 5 s. Calculate the acceleration of the bicycle in both the cases. (3)

Q. 13 Two objects of masses 100 g and 200 g are moving along the same line and direction with velocities of 2 ms^{-1} and 1 ms^{-1}, respectively. They collide and after the collision the first object moves at a velocity of 1.67 ms^{-1}. Determine the velocity of the second object. (3)

Q. 14 Prove the law of conservation of momentum with a clear explanation, diagram and equation. (3)

Q. 15 According to Newton's law of gravitation, the apple and the Earth experience equal and opposite forces due to gravitation. However, it is the apple which falls towards

Q. 16. Describe any three functions of the Golgi apparatus. (3)

Q. 17. Name the following: (3)
(i) Epithelial tissue containing thin, flat, irregular cells
(ii) Epithelial tissue found in the ducts of salivary glands
(iii) Epithelial tissue present in glands such as the thyroid and pituitary glands

Q. 18 What are the management practices required to be taken in a livestock farm to ensure a healthy and productive livestock population? (3)

Q. 19 (5)

(a) Name the appropriate methods to separate the following:
  (i) Nitrogen from air
  (ii) Dye from blue ink
  (iii) Cream from milk
  (iv) Ammonium chloride from common salt

(b) Crystallisation is a better technique than simple evaporation. Give one reason to justify the statement.

(c) Draw a labelled diagram to show the process of separation of immiscible liquids.

Q. 20 The velocity–time graph for an object is shown in the following figure. (5)
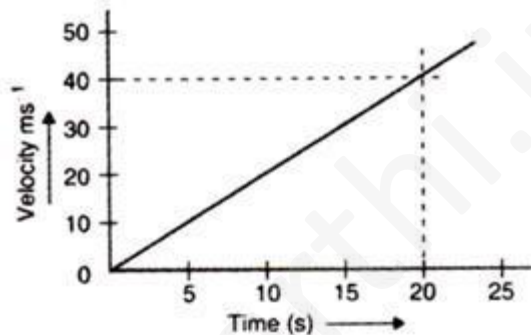
(a) State the kind of motion which the above graph represents.
(b) What does the slope of the graph represent?
(c) What does the area under the graph represent?
(d) Calculate the distance travelled by the object in 15 s.

Q. 21 (5)

(a) Using Newton's law of motion, derive the relation between force and acceleration.
(b) Define one newton.
(c) Which would require a greater force to accelerate—a 0.5 kg mass at 5 m/s^2 or a 4 kg mass at 2 m/s^2? Give reasons.

Q. 22 (5)

(a) Draw a neat labelled diagram of a prokaryotic cell.
(b) Why are organisms such as bacteria called prokaryotes?

Q. 23 (5)

(a) What is lactation period? Name two breeds of cattle which are selected for their long lactation period. Why are they crossed with local breeds?
(b) What are roughage and concentrates?

Q. 24 Compare in tabular form the properties of solids, liquids and gases with respect to (5)

   (i) Shape

   (ii) Volume

   (iii) Compressibility

   (iv) Diffusion

   (v) Fluidity or rigidity

SECTION B

Q. 25 The correct figure of sclerenchyma tissue is   (1)

   (i)   (ii)   (iii)   (iv)
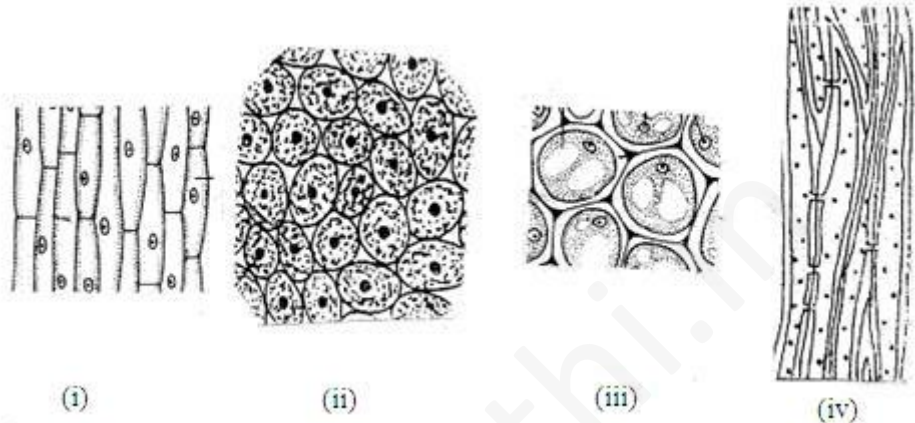
   A. (i)

   B. (ii)

   C. (iii)

   D. (iv)

Q. 26 The principle of working of a spring balance is based on   (1)

   A. Plasticity of metals

   B. Elasticity of metals

   C. Ductility of metal

   D. Malleability of metals

Q. 27 A student sets up an apparatus for determining the boiling point of water. He records the temperature after regular intervals and finds that water when it begins to boil (1)

   A. Remains constant

   B. Continuously rises

   C. First rises and then becomes constant

   D. First remains constant and then rises

Q. 28 Metanil yellow is   (1)

   A. A dye used in the textile industry

   B. A chemical used in laundry

   C. Acid used in neutralisation reactions

   D. Salt formed after a neutralisation reaction between an acid and a base

Q. 29 The following substances are added to water in a beaker as shown below. The mixture is stirred well. A true solution is found in the beaker. (1)
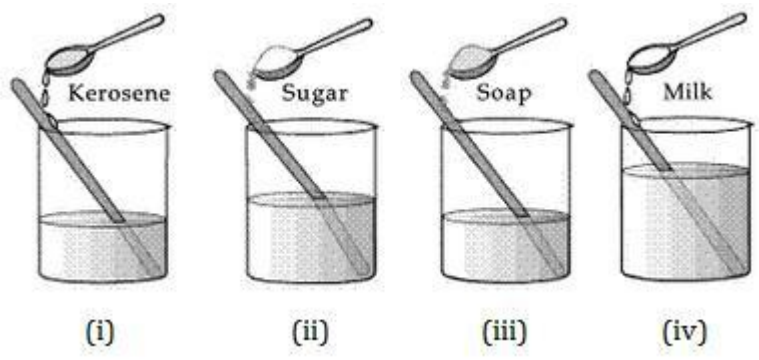
A. (i)
B. (ii)
C. (iii)
D. (iv)

Q. 30 Ritu added few drops of iodine solution to test tubes A, B and C containing food samples. She observed that a blue–black colour appeared in the test tubes A and C. What was the correct order of the food samples in the test tubes? (1)
A. Potato, dal, dal
B. Rice, potato, dal
C. Rice, dal, potato
D. Potato, potato, rice

Q. 31 A man pushes on a wall out of frustration with a force of 30 newton. What force does the wall exert on the man? (1)
A. 60 N
B. 30 N
C. 15 N
D. 0 N

Q. 32 Action and reaction forces are always (1)
A. Equal and in the same direction
B. Unequal and in the same direction
C. Equal and in the opposite direction
D. Unequal and in the opposite direction

**Q. 33** The starch test gives blue–black colour because starch reacts with iodine to form (1)
A. Glucose–potassium complex
B. Starch–carbon complex
C. Starch–iodine complex
D. Glucose–potassium complex

Q. 34 A teacher focused the slide given below under a compound microscope. Which of the following students identified it correctly? Why? (2)
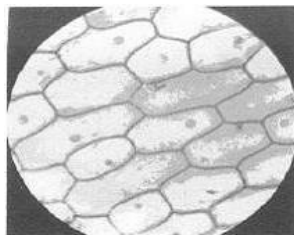
    A. Sheela identified it as cheek cells.
    B. Madhu identified it as squamous epithelium.
    C. Balaji identified it as parenchyma.
    D. Shanti identified it as onion peel.

Q. 35 Which one of the following experimental setups is correct for the determination of the boiling point of water? Why? (2)

          I   II   III
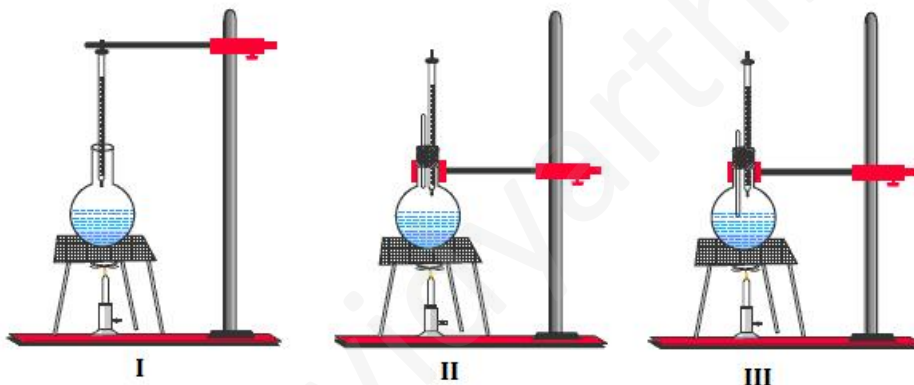
Q. 36 (2)

(i) To move a wooden block A placed on a horizontal surface, Atul uses a spring balance and measures the minimum required force F_1. Now, he keeps one more block B over it and then measures the minimum required force as F_2. The relation between F_1 and F_2 is

    A. $F_1 > F_2$
    B. $F_2 > F_1$
    C. $F_1 = F_2$
    D. It depends on which face of block A is placed on the surface

(ii) What will happen if the blocks are interchanged?

CBSE
Class IX Science
Term 1
Solutions

Time: 3 hrs   **Maximum Marks: 90**

SECTION A

Ans.1 When the cell is damaged, lysosomes burst to release the lytic enzymes which digest the entire cell. Hence, lysosomes are called suicidal bags of the cell.

Ans.2 When the liquid is heated, its temperature increases. Due to this, particles of liquid get enough kinetic energy to go into the vapour state. This increases the rate of evaporation.

Ans. 3

    Force
    Gravitational constant

Ans. 4

    During the burning of a candle, both physical and chemical changes take place.

- **Physical Change**

    When a candle is lit, the heat of the flame melts the solid wax to liquid wax. This signifies a physical change from the solid state to the liquid state. Also, as the wax melts, the size of the candle decreases. It then solidifies and takes a different shape.

(ɪɪɪ)   **Chemical Change**

    The wax acts as a fuel when we light the candle and is basically carbon. The carbon combines with oxygen to form another chemical substance—carbon dioxide—and water.

    Also, the unburnt carbon is deposited as a black substance called soot. This signifies a chemical change.

Ans. 5

    When we walk on the ground, our foot pushes the ground in the backward direction (action) and the ground pushes our foot in the forward direction (reaction). This reaction helps us to move forward. However, when our foot falls on a peel of banana, the peel cannot push the ground in the backward direction as the friction is reduced. Consequently, no reaction force acts on our foot and we lose balance.

Ans. 6

    Two types of food requirements of dairy animals are

(i). Maintenance requirement: Food required to support the animal to live a healthy life.
(ii). Milk-producing requirement: The type of food required during the lactation period.

Ans. 7

| Parenchyma	Collenchyma
1. Cells are generally isodiametric in shape.	1. Cells are elongated in shape.
2. The cell wall is thin.	2. The cell wall is thickened as extra cellulose is deposited on the corners of the cell wall.
3. Stores and assimilates food.	3. Provides mechanical support and flexibility to the plant.

Ans. 8

(i). Both air and bromine vapours are made of tiny moving particles. The moving particles of bromine vapour and air collide with each other and bounce about in all directions due to which they get mixed uniformly.

(ii). This process is called diffusion.

Ans. 9

Activity: To show the sublimation of ammonium chloride.

• Take some ammonium chloride. Crush it and put it in a China dish. •
Put an inverted funnel over the China dish.

• Put a cotton plug on the stem of the funnel, as shown in the diagram below.

• Now, slowly heat the China dish with the help of a Bunsen burner and observe.

• Solid ammonium chloride on exposure to heat will directly change into the vapour state.

• The vapours on rising in the funnel will start condensing and form crystals of ammonium chloride.
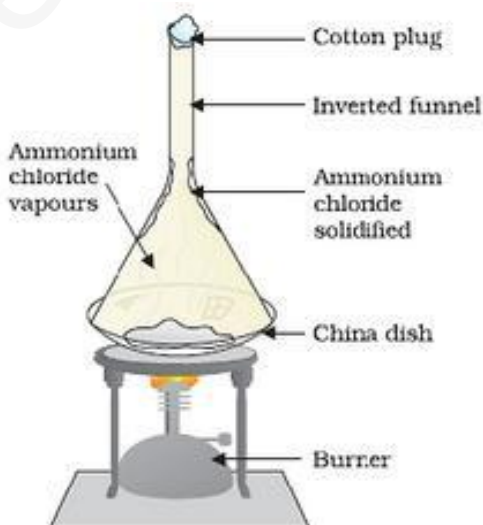
Ans. 10

The government should regulate the production and supply of such medicines. There should be a proper law for sale and purchase of such medicines.

The most common way of expressing the concentration of a solution is the 'percentage method'. It refers to the 'percentage of solute' present in the solution.

Mass of glucose (solute) = 30 g

Mass of water and alcohol (solvent) = 300 – 30 = 270 g

11. Ans.

(i) Colloidal solution: Milk, blood

(ii). Suspension: Oil and water, sand and water

(iii). True solution: Sugar in water, potassium permanganate in water

12. Ans.

In the first case, when Rehan paddles:

u = 0; v = 6 m/s; t = 30 s

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

$$= \frac{6 - 0}{30}$$

$$= 0.2 \text{ m/s}^2$$

In the second case, when the brakes are applied:

u = 6 m/s; v = 4 m/s; t = 5 s

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

$$= \frac{4 - 6}{5}$$

$$= -0.4 \text{ m/s}^2$$

13. Ans.

According to the law of conservation of momentum, we have

Total momentum of the system before collision = Total momentum of the system after collision

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

$$0.1 \times 2 + 0.2 \times 1 = 0.1 \times 1.67 + 0.2 \times$$

$$v_2 \; 0.2 + 0.2 = 0.167 + 0.2 v_2$$

$$\therefore v_2 = \frac{0.4 - 0.167}{0.2} = 1.165 \text{ /s}$$

14. Ans

.
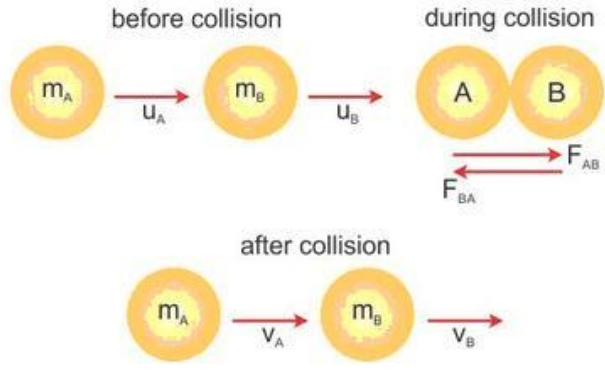
Consider two balls A and B of masses m_A and m_B, respectively, moving in the same direction along a straight line with velocities u_A and u_B. They collide for time t. After collision, their velocities become v_A and v_B.

Force exerted by A on B is

F_{AB} = Rate of change of momentum of B

$$= \frac{m(v_A - u_A)}{t}$$

Force exerted by B on A is

F_{BA} = Rate of change of momentum of A

$$= \frac{m(v_B - u_B)}{t}$$

We assume that no other external unbalanced forces are acting on the balls.

According to Newton's third law of motion, action and reaction are equal and opposite.

$$F_{AB} = -F_{BA}$$

$$\frac{m_A(v_A - u_A)}{t} = -\frac{m_B(v_B - u_B)}{t}$$

$$m_A(v_A - u_A) = -m_B(v_B - u_B)$$

$$\therefore m_A u_A + m_B u_B = m_A v_A + m_B v_B$$

Thus, total momentum before collision is equal to total momentum after collision.

15. Ans.

Let M and m be the masses of the Earth and the apple, respectively, and r be the distance between them. Thus, the force of gravity between them is

$$F = \frac{GMm}{r^2}$$

Due to this force, acceleration in the apple is

$$a_{Apple} = \frac{F}{m} = \frac{GM}{r^2}$$

Acceleration produced in the Earth is

$$a_{Earth} = \frac{F}{M} = \frac{Gm}{r^2}$$

Therefore, we have

$$\frac{a_{Earth}}{a_{Apple}} = \frac{m}{M}$$

As m << M, so a_{Earth} << a_{Apple}

So, we are unable to observe the acceleration of the Earth towards the apple.

Ans. 16

Functions of Golgi apparatus:

i Material synthesised near the endoplasmic reticulum (ER) is packaged and dispatched to various targets inside and outside the cell through the Golgi apparatus.

ii It is involved in the storage, modification and packaging of products.

iii Sometimes, it also forms complex sugars from simple sugars.

iv It is also responsible for the formation of lysosomes (Any three functions)

Ans. 17

v Squamous epithelium

vi Cuboidal epithelium

vii Glandular epithelium

Ans. 18

Following practices can be implemented in order to ensure healthy life and productive livestock population:

viii Providing shelter facilities which are well ventilated, well lighted and roofed.

ix Proper cleaning with the floor slightly sloping.

x Regular brushing or cleaning of the shed to remove dirt and loose hair.

xi Provide food which includes fibre, roughage and concentrates in balanced ratios.

xii Provision of special food to cattle during the lactation period.

xiii Check against external parasites and skin check against internal parasites such as norms and flukes.

xiv Vaccination against viral and bacterial diseases.

(Any six points)

Ans. 19

(a)

Fractional distillation

Chromatography

Centrifugation

Sublimation

(b) Some impurities may remain dissolved in the solution, and these contaminate the solid on evaporation; thus, crystallisation is a better technique.
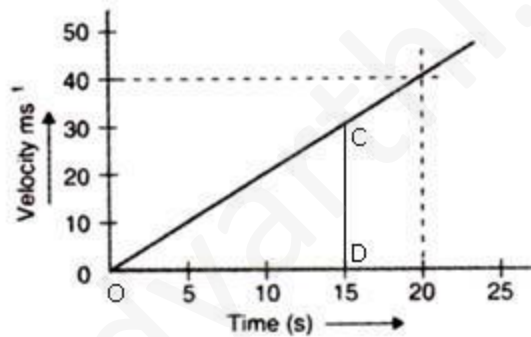
(c) Immiscible liquids are separated by the process of sublimation.

Separating funnel

Kerosene oil

Water

Stopcock
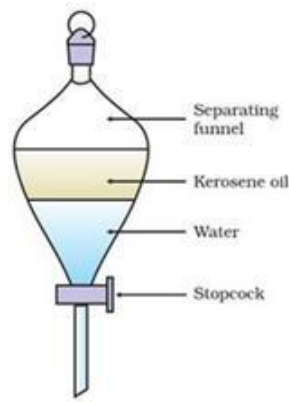
Sublimation

20. Ans.

(a) The graph represents uniformly accelerated motion.

(b) The slope of the graph gives acceleration of the object.

(c) The area under the graph represents the distance travelled by the object.

Distance = Area of right triangle ODC. $= \frac{1}{2} \times b \times h = \frac{1}{2} \times 15 \times 30 = 225$ m

21. Ans.

(a) Let m be the mass of an object moving with initial velocity u. Let a constant force F act on the object for time t so that its final velocity becomes v.

Then, initial momentum of the object P_1 = mu

Final momentum of the object P_2 = mv

Change in momentum = $P_2 - P_1$

= mv − mu

= m (v − u)

The rate of change of momentum = m (v − u)/t

According to Newton's second law of motion, the rate of change of momentum is directly proportional to the force applied.

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

$$F = \frac{km(v - u)}{t}$$

$$F = kma$$

The unit of force is so chosen that the value of the constant k becomes one. So, F = ma

(b) One newton is defined as the amount of force exerted on a body of mass 1 kg to produce an acceleration of 1 m/s^2.
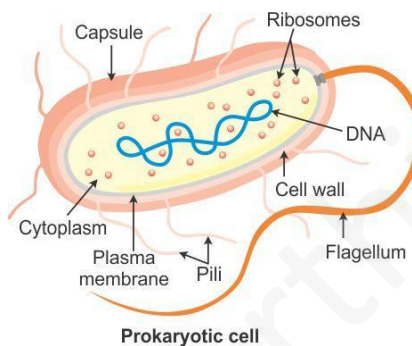
(c)

$$F_1 = 0.5 \text{ kg} \times 5 \text{ m/s}^2 = 2.5 \text{ N}$$

$$F_2 = 4 \text{ kg} \times 2 \text{ m/s}^2 = 8 \text{ N}$$

Hence, 4 kg mass at 2 m/s^2 will require a greater force.

22. Ans.

(a) <u>Prokaryotic Cell</u>:

Prokaryotic cell

(b) The organisms whose cells lack a nuclear membrane are called prokaryotes. In bacteria, the nuclear membrane is absent due to which the nuclear region is poorly developed. Such undefined nuclear region containing only nucleic acids is called nucleoid. Bacteria also lack membrane-bound cell organelles.

Ans. 23

E. The period of milk production after the birth of a calf is called the lactation period. Breeds of cattle selected for their long lactation period are Jersey and Brown Swiss. Local breeds show excellent resistance to diseases, and foreign breeds have long duration of lactation period. The crossing of two breeds can bring both these desired quantities in young ones.

F. Roughage is largely fibrous food used for cattle. Concentrates are low in fibre and contain relatively high levels of proteins.

23. Ans.

Properties	Solids	Liquids	Gases
Shape	Definite shape (intermolecular forces are strong)	Do not have a definite shape, takes the shape of the container	No definite shape (weak intermolecular forces)
Volume	Definite volume (spaces between the particles are fixed)	Definite volume (spaces between the particles are fixed)	No definite volume (spaces between the particles are not fixed)
Compressibility	Negligible	Negligible	High
Diffusion	Can diffuse into liquids	Diffusion is higher than solids	Highly diffusible (rate of diffusion is fastest in gases)
Fluidity or rigidity	Rigid and cannot flow from one place to another	Less rigid and can easily flow	No rigidity and can flow easily

SECTION B

25 Ans. D. Sclerenchyma tissues are long with thickened cell walls due to the deposition of lignin.

26 Ans. B. The working of a spring balance is based on the elasticity of metals.

27 Ans. C. First rises and then becomes constant. As soon as the boiling point is reached, the temperature becomes constant and does not rise as now the heat is used up in converting the liquid to vapour.

28 Ans. A. Metanil is used as an organic dye. It is used in the textile, leather and paper industries.

29 Ans. B. Sugar dissolves completely in water to form a true solution.

30 Ans. C. Solutions from test tubes A and C turn blue-black. The substance present in ` them contains starch. Rice and potato contain starch, while dal is proteinaceous.

31 Ans. B. In accordance with Newton's third law of motion, the wall also exerts an equal and opposite force on the man, i.e. 30 N.

32Ans. C. Action and reaction forces are always equal and opposite.

33Ans. C. When iodine solution is added to starch, a starch–iodine complex is formed which imparts blue colour to the solution.

34Ans. A. Sheela identified it as cheek cells. The human cheek cell is an animal cell. When mounted on a slide, it clearly shows the presence of a plasma membrane, cytoplasm and nucleus.

35Ans. Experimental setup II is correct for the determination of the boiling point of water. This is because in this arrangement, the mouth of the round bottom flask is closed with a two-holed stopper. In one hole, a thermometer is fixed, while in another, a glass tube is fixed. Further, the thermometer bulb is kept above the water level which is the correct way to keep the thermometer.

36Ans.
   (i) B. The force with two blocks F_2 will be greater than with one block F_1,
      i.e. $F_2 > F_1$.
  (ii) If the blocks are interchanged, then no change will occur as the total weight remains the same, and hence $F_2 > F_1$.