

SUMMATIVE ASSESSMENT - I

SCIENCE

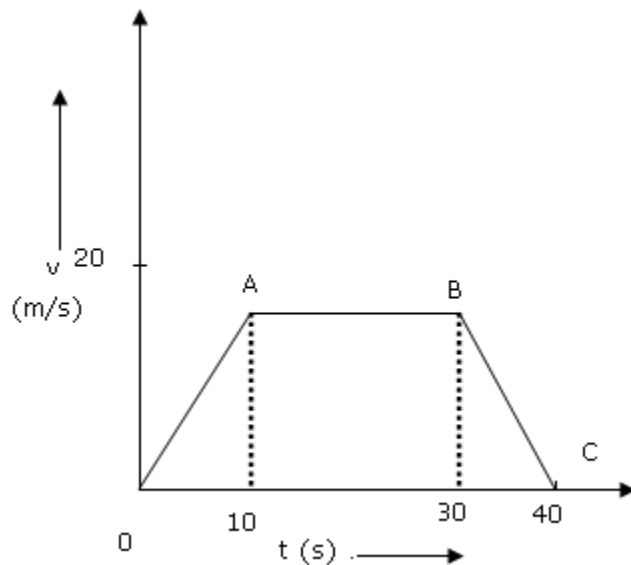
Class - IX

1. What is inertia? [1]
2. Convert: -293 K into Celsius scale [1]
3. Why is osmosis a special type of diffusion? [1]
4. If a planet existed whose mass and radius were both half of that of earth, what would be the acceleration due to gravity at the surface of the planet in terms of that on the surface of earth? [2]
5. Classify the following as a homogeneous and heterogeneous mixture:
(i) Soda water (ii) Air (iii) Soil (iv) Wood [2]
6. How does cork act as a protective tissue? [2]
7. State any two reasons for plant cells to have large central vacuole. [2]
8. The brakes applied to a car produce an acceleration of 6 m/s^2 in the opposite direction to the motion. If the car takes two seconds to stop after the application of brakes, calculate the distance it travels during this time. [3]
9. Mass of a girl, Pragya is 50 kg. What will be her approximate weight on earth? How will her mass and weight change on moon? [3]
10. State Newton's second law of motion. Write its mathematical expression. How can you state first law from it? [3]
11. State universal law of gravitation and give its mathematical expression. Name any two phenomena which were explained on the basis of this law. [3]
12. (a) A ball is thrown vertically upwards. What is its momentum at the highest point? [1]
(b) Calculate momentum of a toy car of mass 300 g moving with a speed of 18 km/h. [2]
13. (a) Why should we call a wooden table a solid?
(b) Give reason why naphthalene balls disappear with time without leaving any solid.
(c) Name the state of matter that has minimum interparticle attraction [3]
14. (a) Give two reasons to justify that air is a mixture and not a compound?
(b) Name the technique used to separate butter from curd. [3]
15. What are weeds? Why is removal of weeds essential? Name any two measures of weed control. [3]

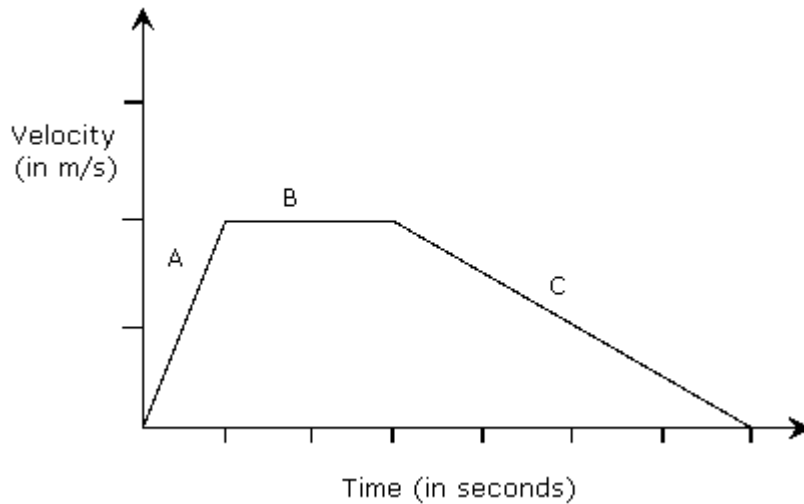
16. Draw a labeled diagram to show the difference between the structures of any two types of muscles fibres. [3]
17. (a) What is meant by bee-keeping? Name [3]
 (b) The variety commonly used for commercial honey production.
 (c) The variety having high honey collection capacity. Name the factor on which the quality of honey depends. [3]
18. (a) Why is mitochondria called the powerhouse of the cell? [3]
 (b) Mention any two functions of Golgi apparatus. [3]
19. (a) Name the type of tissue whose cells are filled with fat globules. Write its one function. [3]
 (b) Write any two characteristics of sclerenchyma tissue. [3]
20. State law of conservation of momentum and give its mathematical verification. [5]

OR

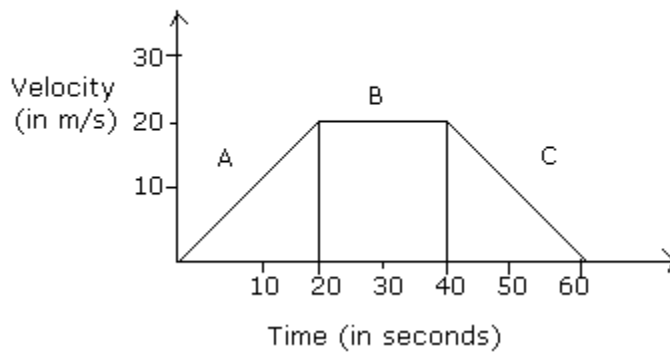
- (a) Define force and give its SI unit. [5]
 (b) For a 2 kg mass, the v-t graph is given. Find the force exerted by the mass in OA, AB and BC.



21. (a) Describe the motion of the object in each part of the graph : [3]



- (b) Calculate the total distance travelled by a body from time $t=0s$ to $t=60s$ from the Velocity - Time graph given below? [2]



OR

- (a) A cyclist goes around a circular track once every three minutes. The radius of the circular track is 110 m; find the speed of the cyclist. [2]
 (b) A train travelling at a speed of 60 km/hr is stopped in 15 seconds by applying the brakes. Determine its retardation. [3]
 Why retardation is negative?

22. (a). Explain with the help of an example, how centrifugation is done?
 (b) Which of the following matter fall in the category of pure substance?
 (i) Ice (ii) Brick (iii) air (iv) milk (v) wood (vi) calcium oxide [5 marks]

OR

Butter is an example of one type of colloid. Name it. Give a reason for your choice.

- (b) Classify the following as physical and chemical changes?

- (i) Rusting of iron
 (ii) Mixing of iron
 (iii) Burning of a candle

- (iv) Freezing of water
 - (v) Growth of a plant
 - (vi) Digestion of food
- [5]

23. A student drop a crystal of copper sulphate into a glass of hot water.
- (i) What do he/she observe just above the solid crystal in the glass?
 - (ii) What happens as the time passes?
 - (iii) What does this suggest about the particles of solid and liquid?
 - (iv) Does the rate of mixing change with temperature? Why and how?
- [5]

OR

(a) Give reason for the following:-

- (i) Solids have a regular geometrical shape whereas liquids do not have a definite shape.
- (ii) Gases are compressible but liquids and solids are not.

(b) Why do we see water droplets on the outer surface of a glass containing ice cold water? [5]

24. (a) What is crop rotation?
(b) Give any two points to describe the advantages of crop rotation.
(c) What will happen if a farmer grows two cereal crops in alternate rows? [5]

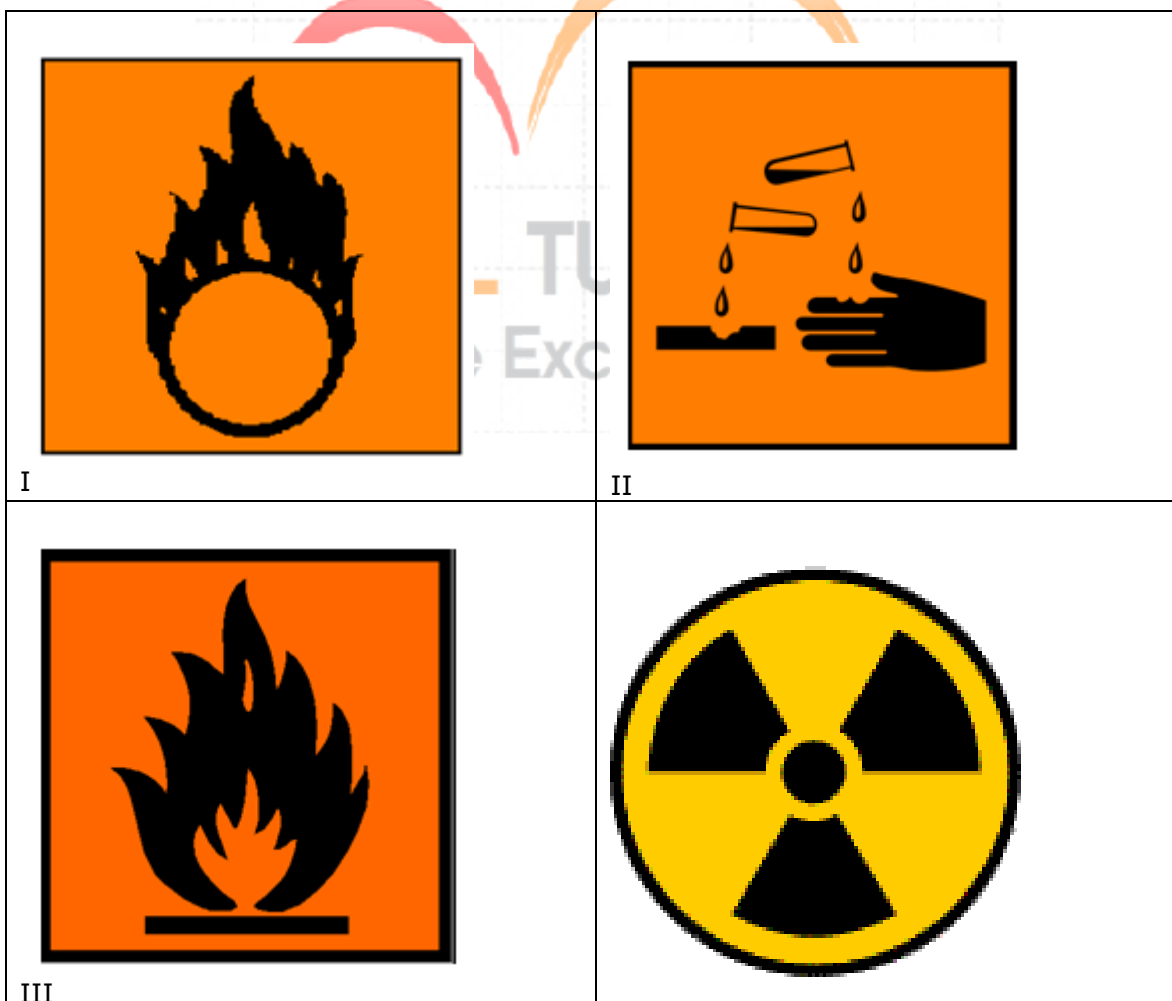
OR

- (a) What is the scientific name of cow and buffalo?
- (b) What does animal feed consists of?
- (c) Name any two parasites which causes diseases to dairy animals.
- (d) What is photoperiodism?

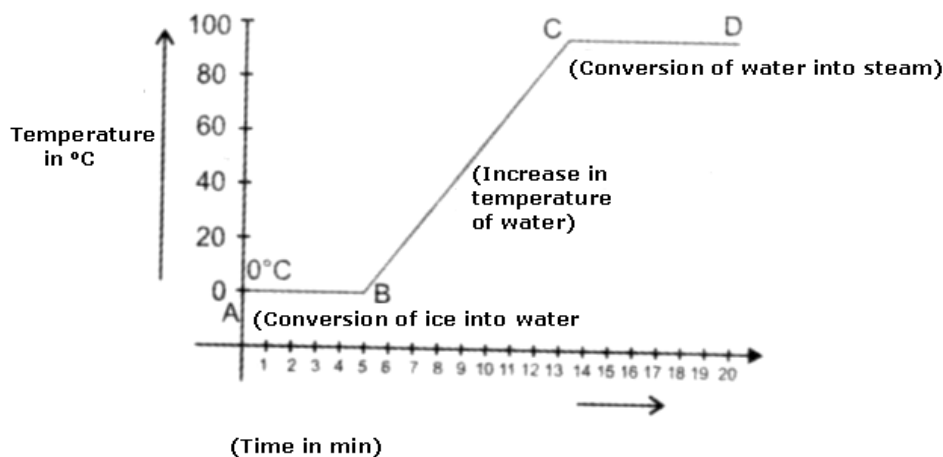
Section B

25. In the spring balance experiment, if the least count of a spring balance is 10 gwt./div, then what will be reading if the pointer is at 4th mark after zero?
- (a) 10 gwt.
 - (b) 20 gwt.
 - (c) 30 gwt.
 - (d) 40 gwt.
26. In the spring balance experiment, if the readings on the spring balance are in the units of mass, then then to know the magnitude of force acting on the sprong balance, we should
- (a) divide the reading by g
 - (b) multiply the reading by g
 - (c) add g to the reading
 - (d) do nothing

27. A system of a solid in a liquid is heterogeneous, stable and its components cannot be separated by filtration. This system represents which one of the following?
- a) Colloid
 - b) True solution
 - c) Suspension
 - d) All the above
28. The correct procedure for preparing a colloidal solution of egg albumin in water is:
- a) Break egg shell, take only white portion and add it to water with constant stirring
 - b) Break egg shell, take only yellow portion and add it to boiling water with constant stirring
 - c) Boil egg; break the egg shell, to add the white portion to ice cold water and to mix
 - d) Boil the egg, break the egg shell, and add the yellow portion to water and mix
29. Amongst the safety symbol pasted here the symbol correct for carbon disulphide (CS_2) is



- a) I
b) II
c) III
d) IV
30. When magnesium burns with oxygen, it gives:
a) Grey brown powder of $\text{Mg}(\text{OH})_2$
b) White powder of MgO
c) White powder of $\text{Mg}(\text{OH})_2$
d) Grey powder of MgO
31. Inferences drawn by temperature versus time graph given below are



- a) Temperature does not rise after all the ice melts
b) At a specific temperature water starts boiling and temperature remains the same during the conversion of water into steam
c) During melting of ice, temperature changes
d) All the above
32. Identify the correct sequence for the procedure to determine the boiling point of water:
- Take about 70 – 100 mL of fresh distilled water in a boiling tube.
 - Heat the boiling tube gently by rotating the flame. Note the temperature when boiling of water starts. Continue to heat the water till the temperature becomes constant and water remains boiling. Note the constant temperature.
 - Fix a cork with two bores in the mouth of the boiling tube and clamp it with the stand. Introduce a thermometer in one bore of the rubber cork and a delivery tube in the second bore.
 - Place a beaker below the second end of the delivery tube.
 - Add 2- 3 small pieces of pumice stone.

- a) (i), (v), (iii), (iv) and (ii)
b) (i), (iv), (iii), (v) and (ii)
c) (i), (ii), (iii), (iv) and (v)
d) (i), (ii), (iii), (v) and (iv)
33. The property of sublimation shows the direct conversion of:
a) Solid to liquid and liquid to solid
b) Solid to gas and gas to solid
c) Solid to solid
d) Liquid to gas
34. Which gas is produced by the action of dil. HCl on the mixture of iron fillings and sulphur powder.
a) O₂
b) H₂
c) NH₃
d) H₂S
35. On heating lead nitrate, the gas released is:
a) Reddish brown oxygen gas
b) White nitrogen gas
c) White nitrogen dioxide gas
d) Reddish brown nitrogen dioxide gas
36. Which compound formed when iron heated with sulphur?
a) FeS
b) FeS₂
c) Fe₂S₃
d) Fe₂S
37. The solution used to test the presence of starch is:
(a) Methylene blue (b) iodine (c) safranin (d) conc HCl
38. The reagent used to test the presence of metanil yellow in dal is:
(a) HNO₃ (b) iodine solution (c) HCl (d) safranin
39. The organelle not observed in animal cell is:
(a) Nucleus (b) Cytoplasm
(c) Chloroplast (d) plasma membrane
40. Cells of a tissue in the mounted slide were observed to have large vacuole and irregularly thickened at corners. The given tissue is:
(a) Parenchyma (b) sclerenchyma
(c) Xylem (d) collenchyma
41. For observing plant tissues the stain generally used is:
(a) Methylene blue
(b) Safranin
(c) Phenolphthalein
(d) Glycerine

42. On observing the side of a tissue it was found that the cells have thickened cell walls and inside the cell, there is no protoplasm. The given tissue is:
- | | |
|------------------|-----------------|
| (a) Parenchyma | (b) collenchyma |
| (c) Sclerenchyma | (d) phloem |



Solution

SECTION A

1. Inertia of a body is in the inability of a body to change by itself its state of rest or state of uniform motion along a straight line. [1]
2. $(293 - 273)K = 20^{\circ}C$ [1]
3. Osmosis is a special type of diffusion because both involve movement of molecules from the region of its higher concentration to the region of lower concentration. [1]
4. Acceleration due to gravity on earth $g_e = GM_e / R_e^2$ [1]
where M_e = Mass of earth, R_e = radius of earth
Acceleration due to gravity on given planet $g_p = GM_p / R_p^2$
Where M_p = Mass of planet, R_p = Radius of planet
 $M_p = M_e / 2$, $R_p = R_e / 2$ (Given)
Thus, $g_p = GM_p / R_p^2 = \frac{G(M_e / 2)}{(R_e / 2)^2} = \frac{2GM_e}{R_e^2}$ [1]
or, $g_p = 2g_e$
5. (i) Homogeneous mixture [1/2]
(ii) Homogeneous mixture [1/2]
(iii) Heterogeneous mixture [1/2]
(iv) Heterogeneous mixture [1/2]
6. Cells of cork are dead and compactly arranged without intercellular space. These cells have a chemical substance called suberin which deposits on the walls of bark and makes them impervious to gases and water and thus it acts as a protective tissue. [2]
7. Vacuoles help in maintain the osmotic pressure of the cell. They store important substance like amino acids, sugars, various organic acids and some proteins. They also store metabolic wastes of the cell. [1+1]

8. here $a = -6 \text{ m/s}^2$, $t = 2 \text{ s}$, $v = 0$ [1/2]
 $V = u + at$
 $0 = u - 6 \times 2$ [1]
 $u = 12 \text{ m/s}$
 $S = ut + \frac{1}{2} at^2$ [1/2]
 $= 12 \times 2 + \frac{1}{2} \times -6 \times 2 \times 2$ [1]
 $= 24 - 12 = 12 \text{ m}$
9. Mass = 50 kg
Weight = mg
On earth $g = 10 \text{ m/s}^2$ (approx.) [1]
 $W = 50 \times 10 = 500 \text{ N}$ [1]
Weight on moon = $500/6 = 83.3 \text{ N}$ (approx.)
Mass on moon = 50 kg (as it remains constant) [1]
10. Rate of change of momentum of an object is directly proportional to the impressed force and takes place in the direction of force. [1]
 $F = ma$ [1/2]
If $F = 0$ [1/2]
 $a = 0$
In absence of external force, object continues moving with uniform velocity or stays at rest. [1]
11. Every object in this universe attracts every other object with a force which is directly proportional to the product of their masses and inversely proportional to the square of distance between them. The force is along the line joining the centers of the two objects. [1]
 $F \propto \frac{Mm}{d^2}$
Where $F =$ force, $Mm =$ product of two masses [1]
 $d =$ distance between the centers of two objects.
Phenomena which can be explained:
(i) The force that binds us to earth.
(ii) The motion of the moon around the earth.
(iii) The motion of planets around the sun.
(iv) The tides due to the moon and the sun.
(any two) [1/2+1/2]
12. (a) At the highest point velocity, $v = 0$ [1]
Thus, $p = mv = \text{zero}$.
(b) Here, $m = 300 \text{ g} = 0.3 \text{ kg}$
 $V = 18 \text{ km/h} = \frac{18 \times 1000 \text{ m}}{60 \times 60 \text{ s}} = 5 \text{ m/s}$ [2]
 $P = mv = 0.3 \times 5 = 1.5 \text{ kg m/s}$
13. (a) A wooden table should be called a solid because it matches the characteristics of the solid state. For example, it is hard and rigid. It has a definite volume etc. [1]

(b) Naphthalene has a tendency to undergo sublimation i.e. it changes directly to the gaseous state. Therefore, the size of the naphthalene balls slowly decreases and ultimately they disappear and no solid residue is left. [1]

(c) Gaseous state [1]

14. (a) Air is a mixture and not a compound as discussed below:-
(i) The components of a mixture can be separated by simple physical method. For example, the components of air can be separated by fractional distillation of liquid air. [1]
(ii) The composition of a mixture is variable. The composition of air is also variable. It has more oxygen in the country side than in big cities. [1]
(b) By Centrifugation technique [1]

15. (a) Weeds are unwanted plants grown in the cultivated field. [1]

(b) Removal of weeds is essential because weeds compete for food, space and light with the crops and reduce their growth. [1]

(c) Methods for weed control:

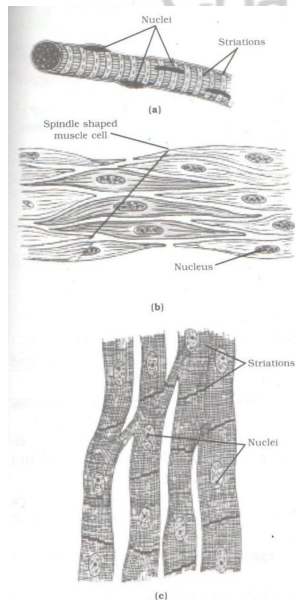
(i) Mechanical method - weeds are removed by hand pricking, uprooting of weeds using tools like rake and deep ploughing. [1/2]

Chemical methods - weeds are removed by the use of weedicides like 2, 4-Dichlorophenoxy acetic acid. [1/2]

16. (a) Striated Muscles

(b) Unstriated Muscles

(c) Cardiac Muscles



17. (a) Rearing of bees for the production of honey on a large scale is called bee keeping.

(b) *Apis mellifera* – Italian bee. [1]

(c) Italian bee. [½]

The value of honey depends upon pasturage. [½]

The value of honey depends upon pasturage. [1]

18. (a) Mitochondria is called the powerhouse of the cell because it has special respiratory enzymes which oxidizes the sugar and release energy. [1]

(b) Function of Golgi Apparatus:

(i) It packages materials synthesised in the cell. [1]

(ii) It helps in the formation of lysosomes. [1]

19. (a) Adipose tissue [1]

Function: It prevents wear and tear. [½]

(b) Characteristics of Sclerenchyma Tissue. [½]

(i) It is hard and rigid due to the deposition of lignin. [1]

(ii) Intercellular spaces are absent. [1]

20. If a group of bodies are exerting force on each other, their total momentum remains conserved before and after the interaction provided there is no external force acting on them. [1]

Mathematical verification:

Let us consider two balls having masses m_1 and m_2 respectively. Let the initial velocity of ball A be u_1 and that of ball B be u_2 ($u_1 > u_2$). Their collision takes place for a very short interval of time t and after that A and B start moving with velocities v_1 and v_2 (now $v_1 < v_2$) respectively.

The momentum of the ball before and after the collision is m_1u_1 and m_1v_1 respectively. If there are no external forces acting on the body, then the rate of change of momentum of ball A, during the collision will be [1]

$$= m_1 (v_1 - u_1) / t$$

And, similarly the rate of change of momentum of ball B [1]

$$= m_2 (v_2 - u_2) / t$$

Let F_{12} be the force exerted by ball A on ball B and F_{21} be the force exerted by ball B on A. Then, according to Newton's second law of motion [1]

$$F_{21} = m_1 (v_1 - u_1) / t$$

$$\text{And } F_{12} = m_2 (v_2 - u_2) / t$$

According to Newton's third law of motion

$$F_{21} = -F_{12}$$

$$\text{Or } m_1(v_1 - u_1)/t = -m_2(v_2 - u_2)/t$$

$$\text{Or } m_1v_1 - m_1u_1 = -m_2v_2 + m_2u_2$$

$$\text{Or } m_1u_1 + m_1v_1 + m_2v_2$$

i.e. Total momentum before collision = Total momentum after collision. [1]

OR

Force is the external agency which changes or tends to change the state of rest or of uniform motion of a body in a straight line or shape of a body. [1]

S.I. unit Newton (N) [1]

OA:

$$a = 20/10 \text{ m/s}^2 = 2 \text{ m/s}^2 \quad [1]$$

$$F = ma = 2 \text{ kg} \times 2 \text{ m/s}^2 = 4 \text{ N}$$

AB:

$$a = 0, m = 2 \text{ kg} \quad [1]$$

$$F = ma = 2 \text{ kg} \times 0 = 0$$

BC:

$$a = -20/10 \text{ m/s}^2 = -2 \text{ m/s}^2 \quad [1]$$

$$F = ma = 2 \text{ kg} \times -2 \text{ m/s}^2 = -4 \text{ N}$$

21. (a) In region A the object is moving with constant acceleration. [3x1=3]
 In region B the object is moving with constant velocity.
 In region C the object is moving with constant negative acceleration or retardation.

(b) The total distance travelled by the object can be calculated by measuring the area between the graph and the baseline. [1]
 This is called the area under the graph.

The area under the graph shown can be divided into two triangles and one rectangle.

$$\text{The area of triangle A is } \frac{1}{2} \times \text{base} \times \text{height} = 0.5 \times 20 \times 20 = 200.$$

$$\text{The area of triangle C} = 0.5 \times (60 - 40) \times 20 = 200.$$

$$\text{The area of rectangle B} = (40 - 20) \times 20 = 400.$$

$$\text{The distance travelled is the total area} = A + B + C = 200 + 200 + 400 = 800 \text{ m.} \quad [1]$$

OR

$$(a) \quad v = \frac{2 \times 22 \times 110}{7 \times 180} = 3.84 \text{ m/s} \quad [2]$$

(v)

$$u = 60 \text{ km/h} = \frac{60 \times 5}{18} \text{ m/s} \quad [1]$$

$$v = 0 \text{ m/s}$$

$$t = 15 \text{ sec}$$

$$a = \frac{v - u}{t} = \frac{0 - \frac{60 \times 5}{18}}{15} \\ = -\frac{10}{9} \text{ m/s}^2 \quad [1]$$

The velocity keeps on decreasing, so we have negative acceleration called as retardation. [1]

22. (a) In centrifugation process, the mixture is taken in a closed bottle and rotated at a high speed. The heavy particles settle at the bottom while light particles remain behind. For example to separate cream from milk, milk is churned for 2-3 minute. Cream collects at the centre and being lighter than milk, floats at the top of the mixture. [2]

(b)

- (i) Ice - It is a compound
 - (ii) Brick - It is not a pure substance
 - (iii) air - It is not a pure substance
 - (iv) Milk - It is not a pure substance
 - (v) Wood - It is not a pure substance
 - (vi) Calcium oxide - It is a compound
- [1/2 x 6]

OR

The colloid is an example in which solid acts as the dispersion medium while liquid acts as the dispersion phase. It is also called gel. [1]

On pressing butter, liquid drops come out of it leaving behind a solid. This clearly shows that butter is a gel. [1]

(b)

- (i) Rusting of iron - chemical change
 - (ii) Mixing of iron - physical change
 - (iii) Burning of a candle - chemical change
 - (iv) Freezing of water - physical change
 - (v) Growth of a plant - chemical change
 - (vi) Digestion of food - chemical change
- [1/2 x 6]

23. (i) The solid crystal starts spreading out colour in the glass. [1]
(ii) With the passing time, the water becomes dark colour. [1]
(iii) This suggests that the particles of solid go into the intermolecular spaces of the liquid i.e., diffusion takes place of solid into liquid. [1]
(iv) Yes, because the rate of mixing is directly proportional to the temperature. As the temperature increases, the intermolecular force of attraction decreases, the solid

particles gain more kinetic energy and easily diffuse into the liquid.

[1+1]

OR

(i) The intermolecular forces between the solid particles are very strong due to which they have a highly orderly arrangement leading to their regular geometrical shape. Whereas in liquids, the intermolecular forces are present but they are not strong enough to keep liquid particles in their fixed position. Due to this reason, liquids do not have definite shape. [2]

(ii) The intermolecular distance between gas molecules are very large whereas in liquids and solids this distance is very less. Due to this reason, gases are highly compressible, liquids to very lesser extent and solids are least compressible. [2]

(b) When water vapours present in air come in contact with the cold surface of glass of water, it loses energy and changes into liquid state in the form of water droplets. [1]

24. (a) Crop rotation is the practice of growing different crops on a piece of land in a preplanned succession. [1]

(b) Advantages of crop Rotation:

(i) It helps in the replenishment of soil fertility. [1]

(ii) It prevents depletion of selective nutrients. [1]

(c) If two cereal crops are grown together in alternate rows, these will be no benefit because both crops will have similar requirements of nutrients, water, sunlight and space which leads to decrease in crop yield. [2]

OR

(a) The scientific name of cow is Bos indicus and buffalo is Bos bubalis. [$\frac{1}{2}$, $\frac{1}{2}$]

(b) Animal feed consists of roughage and concentrates. Roughage is a coarse and fibrous food with low nutrition. Concentrates are the substances which are rich in one or more nutrients. [2]

(c) Fleas, lice and mites. [1]

(d) Photoperiodism is the effect of duration of sunlight in the day and night cycle on seed germination and flowering in plants. [1]

SECTION B

25. (d)

[1]

26. (b)	[1]
27: (a)	[1]
28: (a)	[1]
29: (c)	[1]
30: (b)	[1]
31: (b)	[1]
32: (a)	[1]
33: (b)	[1]
34: (b)	[1]
35: (d)	[1]
36: (a)	[1]
37. (b)	[1]
38. (c)	[1]
39. (c)	[1]
40. (d)	[1]
41. (b)	[1]
42. (c)	[1]

