



CBSE  
Class IX  
Term I  
Summative assessment I  
Solution

**SECTION A**

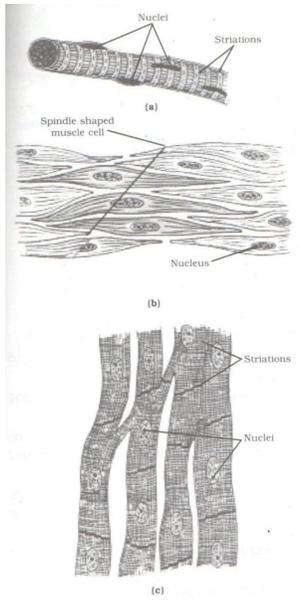
1. Inertia of a body is in the inability of a body to change by itself its state of rest or state of uniform motion along a straight line. [1]
2.  $(293 - 273)K = 20^{\circ}C$  [1]
3. Osmosis is a special type of diffusion because both involve movement of molecules from the region of its higher concentration 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]  
 $F \propto Mm / d^2$   
 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. [½]  
Chemical methods – weeds are removed by the use of weedicides like 2, 4-Dichlorophenoxy acetic acid. [½]
16. (a) Striated Muscles  
 (b) Unstriated Muscles  
 (c) Cardiac Muscles





(Any two diagrams) [1½ + 1½]

17. (a) Rearing of bees for the production of honey on a large scale is called bee keeping. [1]

(b) *Apis mellifera* – Italian bee. [½]

(c) Italian bee. [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 [½]

Function: It prevents wear and tear. [½]

(b) Characteristics of Sclerenchyma Tissue.  
(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  $m_1 u_1$  and  $m_1 v_1$  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]

$F_{21} = m_1 (v_1 - u_1) / t$   
And  $F_{12} = m_2 (v_2 - u_2) / t$   
According to Newton's third law of motion  
 $F_{21} = -F_{12}$



Or  $m_1(v_1 - u_1)/t = -m_2(v_2 - u_2)/t$

Or  $m_1v_1 - m_1u_1 = -m_2v_2 + m_2u_2$

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:

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

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

AB:

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

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

BC:

$a = -20/10 \text{ m/s}^2 = -2 \text{ m/s}^2$   
 $F = ma = 2 \text{ kg} \times -2 \text{ m/s}^2 = -4 \text{ N}$  [1]

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.

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

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

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

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

**OR**

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



(b)

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

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

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

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

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]