

SOLUTIONS

CBSE Class 9 Science

SAMPLE QUESTION PAPER - 4

Solved _____

Time : 3 Hours

Maximum Marks : 90

SECTION 'A'

1. The smooth endoplasmic reticulum helps in the manufacture of fats or lipids. 1
2. Odometer. 1
3. (a) Negative
(b) Positive $\frac{1}{2} + \frac{1}{2}$
4. (a) They are heterogeneous solution.
(b) Particles do not settle due to gravity. 1 + 1

5. Endoplasmic reticulum is a membranous network enclosing a fluid-filled lumen. The two types of endoplasmic reticulum are Rough Endoplasmic Reticulum (RER) and Smooth Endoplasmic Reticulum. (SER). RER has ribosomes attached to its surface. The ribosomes take part in protein synthesis.

SER does not have any ribosomes on it and secretes lipids. Some proteins and lipids synthesised in ER are used for producing new cellular parts, specially the cell membrane, by biogenesis. [CBSE Marking Scheme, 2014] $\frac{1}{2} + 1 + \frac{1}{2}$

6. (i) In the first case, the train travels at a speed of 60 km/h for a time of 0.52 h.

Now,
$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = 60 \text{ km/h}$$

$$\text{Distance} = 60 \times 0.52 = 31.2 \text{ km} \quad \dots(1)$$

- (ii) In the second case, the train travels at a speed of 30 km/h for a time of 0.24 h.

Now,
$$\text{Distance} = \frac{\text{Distance}}{\text{Time}} = 30 \text{ km/h}$$

$$\text{Distance} = 30 \times 0.24 = 7.2 \text{ km} \quad \dots(2)$$

- (iii) In the third case, the train travels at a speed of 70 km/h for a time of 0.71 h

Now,
$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = 70 \text{ km/h}$$

$$\text{Distance} = 70 \times 0.71 = 49.7 \text{ km} \quad \dots(3)$$

From equation 1, 2 & 3, we get,

$$\text{Total distance travelled} = (31.2 + 7.2 + 49.7) \text{ km} = 88.1 \text{ km}$$

$$\text{Total time taken} = (0.52 + 0.24 + 0.71) \text{ h} = 1.47 \text{ h}$$

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

$$= \left(\frac{88.1}{1.47} \right)$$

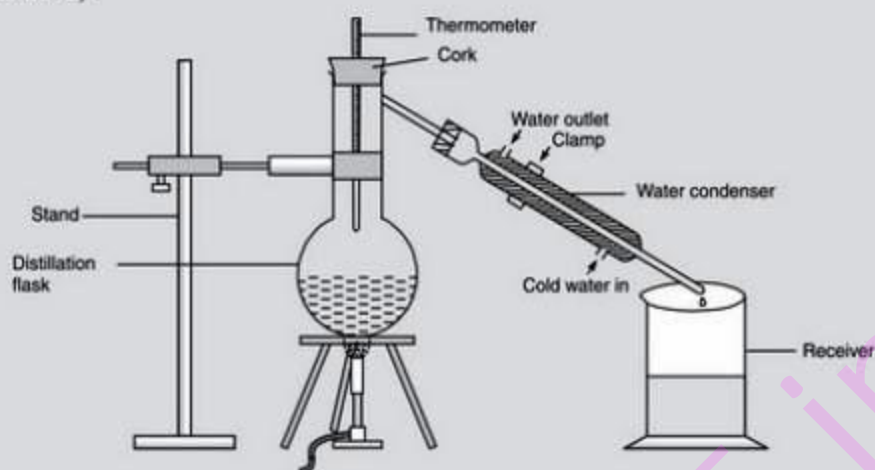
Hence,

$$\text{Average speed} = 59.9 \text{ km/h}$$

3

7. Distillation is a process employed to obtain pure liquid from its solution. It can be defined as the conversion of impure liquid into vapours by evaporation and then condensation of the vapours to get pure liquid.

This method is generally used for the separation of components of a mixture containing two miscible liquids that boil without decomposition and their boiling points are quite different (more than 25-30°C).



Distillation

[CBSE Marking Scheme, 2012] (2 + 1) (Drawing skill 1 Mark)

8.

S. No.	Mixture	Compounds
1.	Elements or compounds just mix together to form a mixture and no new compounds is formed.	Combination of two or more elements.
2.	Variable composition.	Composition of new substance is always fixed.
3.	Shows the properties of the constituent substances.	New substance has totally different properties.
4.	Constituents can be separated fairly easily by physical methods.	Constituents can be separated only by chemical or electrochemical reaction.

(any three) 1 × 3

9. **Velocity** : Rate of change of displacement.

Acceleration : Rate of change of velocity.

Yes, when the body is just released, $u = 0$

but $g = 10 \text{ m/s}^2$

[CBSE Marking Scheme, 2014] 1 + 1 + 1

10. A body thrown vertically upward will move up with decreasing velocity at a constant rate 'g' and its velocity will be zero at the maximum height. The acceleration at the maximum height is still 'g'.

1 × 3

11. Osmosis is the process in which there is a movement of solvent (usually water) from a region of high water concentration to a region of low water concentration.

Difference between osmosis and diffusion :

S.No.	Osmosis	Diffusion
1.	It takes place through semi-permeable membrane.	The diffusion does not require any membrane.
2.	Movement of solvent is involved.	Movement of solid, liquid and gases are involved.

1½ + 1½

OR

Movement of solvent (usually water) from a region of high water concentration to a region of low water concentration; it takes place through semi-permeable membrane whereas the diffusion does not require any membrane, in osmosis movement of solvent is involved whereas in diffusion movement of solid, liquid and gases are involved. [CBSE Marking Scheme, 2014] 3

12. (a) (i) Change in shape.
 (ii) Change in position.
 (iii) Change in speed.
 (b) (i) Net force is zero.
 (ii) Net force is (+ ve)
 (iii) Net force is (- ve)

½ × 6 = 3

13. (a)

$$s = ut + \frac{1}{2}gt^2$$

$$122.5 = 0 \times t + \frac{1}{2} \times 9.8 \times t^2$$

$$122.5 = 4.9 t^2$$

$$t^2 = \frac{122.5}{4.9}$$

$$t^2 = 25$$

$$t = \sqrt{25} = 5 \text{ sec.}$$

- (b)

$$s = ut + \frac{1}{2}gt^2$$

$$= 0 \times 3 + \frac{1}{2} \times 9.8 \times (3)^2$$

$$= \frac{1}{2} \times 9.8 \times 9$$

$$= 4.9 \times 9$$

$$= 44.1 \text{ m}$$

- (c)

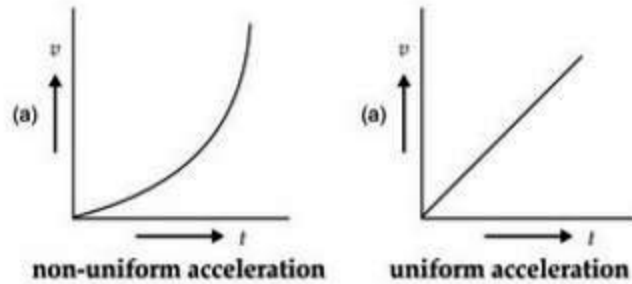
$$v = u + gt$$

$$v = 0 + 4.9 \times 3$$

$$v = 4.9 \times 3$$

$$v = 14.7 \text{ m/s} \quad \text{[CBSE Marking Scheme, 2014] } 1 + 1 + 1$$

14. (i) A body is in uniform acceleration if it travels in a straight path when its velocity increases or decreases by equal time intervals.
 (ii) A body is in non-uniform acceleration if it travels in a straight path when its velocity increase or decrease by unequal amount in equal time intervals.



(1 + 1 + 1)

15.

$$v^2 = u^2 - 2gh$$

$$(0)^2 = u^2 - 2gh$$

$$u^2 = 2gh$$

$$(98)^2 = 2 \times 9.8 \times h$$

$$\frac{98 \times 98}{2 \times 9.8} = h$$

$$h = \frac{98 \times 98 \times 10}{2 \times 98}$$

$$h = 98 \times 5$$

$$h = 490 \text{ m}$$

$$v = u + gt$$

$$(0)^2 = 98 + (-9.80) \times t$$

$$98 = 9.8 t$$

$$t = \frac{98}{9.8}$$

$$t = 10 \text{ sec.}$$

Total time = time to go up + time to go down

$$= 10 + 10$$

$$= 20 \text{ sec}$$

3

16. The universal law of gravitation successfully explained several phenomena which were believed to be unconnected :

- (i) the force that binds us to the earth;
- (ii) the motion of the moon around the earth;
- (iii) the motion of planets around the Sun; and
- (iv) the tides due to the moon and the Sun.

3

17. (a) Weeds. Example – Xanthium

(b) They extract the nutrients from the soil that are meant for the crop plant.

(c) By manual weeding or by applying weedicides.

1

18. (a) Inter cropping. It provides shade and support to other crop.

(b) Mixed cropping. It helps to suppress plant diseases

(c) Crop rotation. It maintains soil fertility.

1 × 3

19. (a) The first equation of motion is $v = u + at$

$$v - u = at \quad \dots(1)$$

$$\text{Average velocity} = \frac{s}{t} \quad \dots(2)$$

$$\text{Average velocity} = \frac{u+v}{2} \quad \dots(3)$$

From equation (2) and equation (3) we get,

$$\frac{u+v}{2} = \frac{s}{t} \quad \dots(4)$$

Multiplying equation (1) and equation (4) we get,

$$(v - u)(v + u) = at \times \frac{2s}{t}$$

$$(v - u)(v + u) = 2as$$

$$v^2 - u^2 = 2as$$

$$[a^2 - b^2 = (a + b)(a - b)]$$

(III equation of motion)

(b)
$$s = ut + \frac{1}{2}at^2$$

$$= 0 \times t + \frac{1}{2} \times 5 \times 10 \times 10$$

$$= \frac{1}{2} \times 5 \times 100$$

$$= 5 \times 50$$

$$= 250 \text{ m.}$$
3 + 2

20. (a) Inertia is a tendency of the object to resist change in its state. Newton's first law of motion also states similar *i.e.*, the object will remain in its present state unless an external force is applied. That's why Newton's first law is called Law of inertia.

(b) A cricket ball as it will have more inertia due to its more mass as compared to the plastic ball.

(c)
$$F = m \times a$$

$$= 1200 \times \frac{20}{3}$$

$$= 400 \times 20$$

$$= 8000 \text{ N.}$$
2 + 1 + 2

21. (a) **Difference :** Evaporation is a surface phenomenon; it takes place at all temperatures. Boiling is a bulk phenomenon. It takes place at fixed temperature.

Similarity : Both process take heat from the surrounding.

(b) Chemical name of dry ice is solid CO_2 . It just looks like ice but is absolutely different— CO_2 is taken in an enclosed cylinder and compressed by applying pressure. The product obtained is dry ice.

(c)

S. No.	Solid	Gases
(i)	Interparticle space is small so the distance is less.	Interparticle space is maximum so the distance is more.
(ii)	Interparticle force of attraction is maximum.	Interparticle force of attraction is minimum.

2 + 2 + 1

22. (i) **Difference between physical and chemical changes :**

S. No.	Physical change	Chemical change
(i)	These are reversible changes and their chemical composition do not change.	These are irreversible changes and the chemical composition also changes.
(ii)	No new substance is formed. <i>e.g.</i> , Tearing of paper.	New substance is formed. <i>e.g.</i> , Burning a match stick.

(a) Water freezes to form ice—physical.

(b) Sugar is dissolved in water—physical

(c) Burning of paper—chemical

(d) Rusting of an iron nail—chemical

(ii) In burning of wax both physical and chemical change is taking place simultaneously. 2 + 2 + 1

23. **Cartilage is a tissue :**

(a) It has widely spaced cells.

(b) All cells are similar in structure.

The matrix of cartilage have a delicate network of collagen fibres and living cells called chondrocytes.

Cartilage is located in ear pinna, nose tip, epiglottis, intervertebral discs, end of long bones, rings of trachea etc.

Functions :

- (i) It provides support and flexibility.
(ii) It smoothens surface at joints. 2 + 1 + 1 + 1
24. (i) **Higher Yield** : To increase the productivity of crop per acre.
(ii) **Improved Quality** : Quality considerations such as baking quality, protein quality, oil quality and preserving quality of crop products vary from crop to crop.
(iii) **Biotic and Abiotic Resistance** : Crop production can go down due to biotic and abiotic stresses under different situations. Varieties resistant to these stresses can improve crop production.
(iv) **Change in Maturity Duration** : The shorter the duration of the crop from sowing to harvesting, the more economical is the variety.
(v) **Wider Adaptability** : Developing varieties for wider adaptability will help in stabilising the crop production under different environmental conditions.
(vi) **Desirable Agronomic Characteristics** : Developing varieties of desired agronomic characters helps to give higher productivity. 5

OR

Explaining about :

- (a) Higher yield
(b) Improved quality
(c) Biotic and abiotic resistance
(d) Change in maturity duration
(e) Desirable agronomic traits or any five traits relevant to it.

[CBSE Marking Scheme, 2014] 5

SECTION 'B'

25. (c) Potato contains starch. 1
26. (b) Metanil yellow gives pink colour with dil.HCl. 1
27. (c) Pure water has no impurities. 1
28. (b) Ammonium chloride is a sublime substance. 1
29. (b) A black mass of FeS will be produced. 1
30. (d) Hydrogen gas is liberated. 1
31. (d) Structure of cheek cell. 1
32. (a) Same reading in all the cases as position does not affect weight. 1
33. (b) $F_2 > F_1$. 1
34. Safranin gives pinkish red colour to the cells. 2
35. Cylindrical. 2
36. Combination reaction. 2

