

**Goa Board**  
**Class IX Science**  
**Term 1**  
**Sample Paper – 3 Solution**

**Time: 3 hrs**

**Total Marks: 90**

**SECTION A**

1. **Ans.** Types of meristematic tissues in plants:
  - (i) Apical meristem
  - (ii) Lateral meristem
  - (iii) Intercalary meristem
  
2. **Ans.** The Earth is orbiting around the Sun in a stable orbit. If the Sun had not been exerting the force, then the Earth would have flown away in a straight line. The force exerted by the Sun on the Earth is used in changing the path of the Earth from a straight line to a circular path.
  
3. **Ans.** On applying pressure and reducing temperature, the gas gets converted to the liquid state.
  
4. **Ans.** Let mass of the body A be  $m_1$  and mass of the body B be  $m_2$ .  
Let  $m_e$  be the mass of the Earth.  
$$F_1 = \frac{Gm_e m_1}{R^2}$$
$$F_2 = \frac{Gm_e m_2}{R^2}$$
As  $F_1 = F_2$ , we have  
$$\frac{Gm_e m_1}{R^2} = \frac{Gm_e m_2}{R^2}$$
$$m_1 = m_2$$
  
5. **Ans.** The applications of chromatography are
  1. To separate colours in a dye or pigment from natural colours.
  2. To separate drugs from blood.
  3. To separate small amounts of products of chemical reactions.
  
6. **Ans.** Farmers use beekeeping as an additional income-generating activity because beekeeping needs low investment and beehives are a source of wax which is used in various medicinal preparations.

**7. Ans.**

- (i) Excessive irrigation may cause soil erosion.
- (ii) Excessive irrigation changes the composition of soil by solubilising some of the minerals from the soil.
- (iii) Over-irrigation leads to water pollution.

**8. Ans.**

- (i) Dry ice can produce much lower temperatures than that produced by ordinary ice; hence, it is much more effective for cooling purposes than ordinary ice.
- (ii) LPG and O<sub>2</sub> gas are supplied in homes and hospitals, respectively.
- (iii) Cooling of the gas is usually done by pouring water over the coils carrying the compressed gas.

**9. Ans.**

- (a) Vaporisation is a surface phenomenon. If the surface area is increased, then the rate of evaporation increases.
- (b) With an increase in temperature, more particles get enough kinetic energy to go into the vapour state; hence, the rate of evaporation increases.
- (c) If the humidity of air is high, then the rate of evaporation decreases.

**10. Ans.**

- (a) Solid sol: Coloured glass, Gem stones
- (b) Aerosol: Fog, Mist
- (c) Emulsion: Milk, Hair cream

**11. Ans.** Fractional distillation is the method used for the separation of components of a mixture containing two miscible liquids which boil without decomposition and have sufficient difference in their boiling points.

Two conditions essential for using this method are

- 1) The two liquids must be miscible, i.e. they totally mix with each other.
- 2) The difference between the boiling points of the liquids should be greater than 25 k.

**12. Ans.**

(a) Acceleration = slope =  $\frac{5}{2} = 2.5 \text{ m/s}^2$

(b)  $F = ma$   
 $= 5 \times 2.5$   
 $= 12.5 \text{ N}$

(c) Change in momentum =  $m(v - u)$   
 $= 5 \times (5 - 0)$   
 $= 25 \text{ kg m/s}$

**13.Ans.** Mass of bullet is  $m_b = 50 \text{ g} = 0.05 \text{ kg}$

Velocity of bullet is  $v_b = 150 \text{ m/s}$

Mass of stone is  $m_t = 60 \text{ kg}$

Velocity of stone is  $v_t = -10 \text{ m/s}$

Negative, because it is in the direction opposite to that of the bullet.

Momentum of  $n$  bullets is  $n(m_b v_b)$ .

Now, momentum before collision is equal to momentum after collision.

The stone has to be stopped, and the bullets will embed inside the stone. Hence, the momentum after collision is zero.

$$n(m_b v_b) + m_t v_t = 0$$

$$\therefore n = \frac{-m_t v_t}{m_b v_b} = \frac{-(60 \times -10)}{0.05 \times 150} = 80$$

**14.Ans.**

(a) The two effects of force are as follows:

(i) Force may move a body at rest.

(ii) Force can change the speed of a body.

(b)  $m = 60 \text{ kg}$

$P = mv = 300 \text{ kgm/s}$

Hence, we have

$$v = p/m = 300/60 = 5 \text{ m/s}$$

**15.Ans.**

(a)

$$W = mg$$

$$\therefore m = \frac{W}{g} = \frac{392}{9.8} = 40 \text{ kg}$$

(b)

(i) Mass is an intrinsic property of the body.

Hence, the mass of man on the Moon remains unchanged = 40 kg

(ii) Weight on Moon =  $\frac{1}{6}$  the weight on the Earth

$$W = \frac{1}{6} \times 392 = 65.33 \text{ N}$$

(iii) Acceleration due to gravity on Moon is

$$g_{\text{Moon}} = \frac{\text{Weight on Moon}}{\text{Mass on Moon}} = \frac{65.33}{40} = 1.63 \text{ m/s}^2$$

**16.Ans.** In crop rotation, crops are grown in a planned sequence from season to season within a year or from year to year.

Advantages of crop rotation:

- i. It controls weeds and pests.
- ii. It cuts down the requirements of fertilisers. This pattern of cropping improves or maintains soil fertility.
- iii. Several crops can be cultivated in succession.

**17.Ans.**

- (a) Connective tissue
- (b) Oxygen and absorbed food
- (c) Concern for other's lives, social responsibility

**18.Ans.**

(a) Osmosis: It is the passage of water from a region of high water concentration through a semi-permeable membrane to a region of low water concentration.

(b) When a cell is placed in a hypotonic solution, it swells up due to the osmotic entry of water into it.

When the cell is placed in a hypertonic solution, it shrinks due to exosmosis.

Osmosis	Diffusion
(i) It is the movement of water from a region of high water concentration to a region of low water concentration.	(i) It is the movement of solid, liquid or gases along the concentration gradient.
(ii) It requires a semi-permeable membrane.	(ii) It does not require a semi-permeable membrane.

(c) Shrinkage of cell content when placed in a hypertonic solution is called plasmolysis.

**19.Ans.**

- a. Solution like X is known as an unsaturated solution.
- b. Solution like Y is known as a saturated solution.
- c. If solution Y at 30°C is cooled down to 10°C by keeping the beaker in crushed ice, then some of the dissolved solid will separate out from the solution and settle at the bottom of the beaker as crystals. This is because the solubility of solid decreases on cooling.
- d. Solubility is the term used to denote the amount of solid dissolved in 100 grams of water in a solution.

**20.Ans.**

(a) When a liquid is left exposed to air, its volume decreases gradually because of evaporation of some of the water from its surface.

(b) The four factors affecting the rate of evaporation are

1. Surface area: Evaporation is a surface phenomenon. If the surface area is increased, then the rate of evaporation increases.
2. Temperature: With the increase of temperature, more particles get enough kinetic energy to go into the vapour state, and hence, the rate of evaporation increases.
3. Humidity: If the humidity of air is high, then the rate of evaporation decreases.
4. Wind speed: With the increase in wind speed, the particles of water vapour move away with the wind, decreasing the amount of water vapour in the surroundings; hence, the rate of evaporation increases.

**21.Ans.**

(i)

Acceleration of the car A is

$$= \frac{80-0}{8-0} = 10 \text{ m/s}^2$$

(ii)

Acceleration of the car B is

$$= \frac{60-20}{4-2} = 20 \text{ m/s}^2$$

(iii) After 2 s and 6 s from the start, the two cars have same velocity.

(iv)

Distance travelled by car A is

$$d_A = \text{Area of } \triangle OAB = \frac{1}{2} \times 8 \times 80 = 320 \text{ m}$$

Distance travelled by car B is

$$d_B = \text{Area of Trapezium CDEB} = \frac{1}{2} \times (7 + 4) \times 60 = 330 \text{ m}$$

Hence, car B is ahead than car A.

**22.Ans.**

(a) Newton's third law of motion: To every action, there is always an equal and opposite reaction and they act on two different bodies.

Examples:

1. To walk on the ground, we push the ground backwards with our foot. As a reaction, the ground pushes our foot forward with the same force. It is this forward reaction force of the ground that enables us to walk forward.
2. While trying to swim, a swimmer pushes the water backwards with his hands and feet. This is the force of action. The water pushes the swimmer forward with the same force (reaction).

(b) A cricketer moves his hands backwards while catching a fast-moving cricket ball so as to increase the time during which the high velocity of the ball reduces to zero. Thus, the acceleration of the ball is decreased, and the impact of catching the fast ball is reduced. The player has to apply a smaller force against the ball so as to stop it. The ball, in turn, exerts a smaller force on his hands, and the hands are not injured.

**23.Ans.** Varieties of crops are improved for the following five reasons:

- (a) High yield: To increase the production of crop per acre.
- (b) Improved quality: The varieties are improved to improve their quality, e.g. baking quality in wheat, oil quality in oil seeds and protein quality in pulses.
- (c) Early maturation: Varieties are improved to shorten their maturation period so that farmers get sufficient time to prepare the field for the next crop.
- (d) Biotic and abiotic resistance: Varieties are improved so that they are able to tolerate various biotic (diseases, pests) and abiotic (heat, cold, frost) stresses.
- (e) Desirable agronomic features: Tallness and profuse branching for fodder crops and dwarfness for cereal crops are desirable agronomic features which give higher productivity.

**24.Ans.**

- (a) The endoplasmic reticulum is a large network of membrane-bound tubes and sheets which serve as channels for the transport of materials (especially proteins) in the cytoplasm or between the cytoplasm and the nucleus.
- (b) The endoplasmic reticulum has membrane bound tubes and sheets which look like long tubules or round or oblong bags (vesicles). These are similar in structure to the plasma membrane.
- (c) Rough endoplasmic reticulum and smooth endoplasmic reticulum.
- (d) Detoxifying various poisons and drugs.
- (e) Membrane biogenesis is building of a cell membrane by the proteins and lipids produced by the smooth endoplasmic reticulum.

**SECTION B**

**25.Ans.** D. The cheek cell is an animal cell which does not have chloroplast.

**26.Ans.** D. Nissl granules are present in nerve cells.

**27.Ans.** A. Osmosis is the process in which water moves from higher concentration to lower concentration.

**28.Ans.** A. When barium chloride is added to sodium sulphate, barium sulphate precipitate is obtained.

**29.Ans.** A. Parenchyma cells are thin walled and living.

**30.Ans.** A. Liquids should not get decomposed during the process of distillation.

**31.Ans.** C. The variation could be either due to zero error or due to the change in the value of  $g$  at that place.

**32.Ans.** C. Same readings being shown in both the spring balances in the spring balance experiment provide proof of Newton's third law of motion.

**33.Ans.** B. In the laboratory, the spring balance is used to measure the weight of the body. It cannot measure the weight of the spring in the spring balance.

**34.Ans.**

(i)  $\mu$  remains unchanged if the mass of a body is increased as it is the property of the material of the surface on which the body is moving.

(ii) If one applies oil in between two surfaces, then  $\mu$  decreases.

**35.Ans.** Blood cells from plasma can be separated by the process of centrifugation.

Principle: The principle is that the denser particles are forced to the bottom and the lighter particles stay at the top when spun rapidly.

**36.Ans.**

- Presence of single nucleus in a cell.
- Cells attached edge to edge without intercellular spaces.
- Presence of a cell wall around each rectangular cell.