

CBSE Board
Class IX Science
Term 1
Sample Paper - 1

Time: 3 hrs

Total Marks: 90

Solution

SECTION-A

1. **Ans.** The heat supplied to the solid gets used up in changing the state by overcoming the forces of attraction between the particles. As this heat energy is absorbed by the solid and does not increase the kinetic energy of particles hence the thermometer does not show any rise in temperature.

2. **Ans.**

(i) Force

(ii) Gravitational constant

3. **Ans.**

When an object is thrown up the direction of motion and velocity is upward but acceleration due to gravity acts in the downward direction. Hence, the direction of motion is along the direction of velocity.

Also, if a car brakes while in motion, then the acceleration is in the opposite direction of motion as well as velocity. Thus, the direction of motion is along the direction of velocity.

4. **Ans.**

Gravitational Constant	Acceleration due to
(G)	Gravity (g)
(a) It is defined as the force of attraction between two objects of unit mass each separated by unit distance.	It is defined as the acceleration of an object freely falling under the action of force of gravity.
(b) Universal constant and its value is $6.673 \times 10^{-11} \text{ Nm}^2 \text{ kg}^{-2}$	Constant at a given place and its value changes from place to place. Mean value of g on surface of earth is 9.8 ms^{-2}

5. Ans.

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. But, when our foot falls on a peel of banana, the peel cannot push the ground in the backward direction. Consequently no reaction force acts on our foot and we lose balance.

6. Ans.

(a) Mrigals or common carp.

(b)

(i) These fishes breed only during monsoon season.

(ii) Lack of availability of good quality seed.

To overcome this problem, fishes are bred by hormonal stimulation.

7. Ans.

(i) Maintenance requirement: Food required to support the animal to live a healthy life.

(ii) Milk producing requirement: Type of food required during the lactation period.

8. Ans.

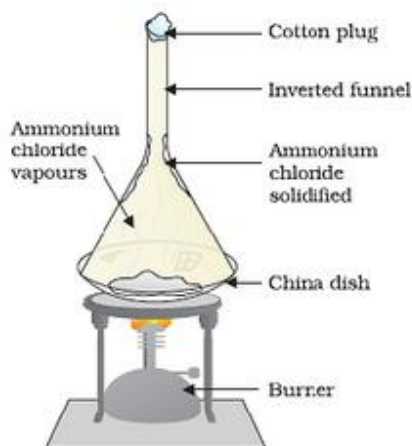
(i) Both air and bromine vapours are made up of tiny moving particles. The moving particles of bromine vapour and air collide with each other and bounce about in all directions due to which they get mixed uniformly.

(ii) This process is called diffusion

9. Ans.

Activity:

1. Take some ammonium chloride. Crush it and put it in a china dish.
2. Put an inverted funnel over the china dish.
3. Put a cotton plug on the stem of the funnel, as shown in the diagram below.
4. Now, heat slowly and observe.
5. Ammonium chloride solid on exposure to heat will directly change into the vapor state.
6. The vapors on rising up in the funnel will start condensing and form crystals of ammonium chloride.



10.Ans.

- (a) Government should regulate production and supply of such medicines. There should be a proper law for sale and purchase of such medicines.
- (b) 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.
- (c) Mass of glucose (solute) = 30 g

$$\text{Mass of water and alcohol (solvent)} = 300 - 30 = 270 \text{ g}$$

11.Ans.

Physical change	Chemical change
(i) No new product is formed.	(i) New products are formed.
(ii) It is a temporary change.	(ii) It is a permanent change.
(iii) The mass of a substance does not alter in this change.	(iii) The mass of a substance does alter in this change.
Example: Melting of wax, cutting of wood.	Example: Rusting of iron, burning of a cracker.

12.Ans.

Colloidal Solution: Milk, Blood.

Suspension: Oil and water, sand and water

True solution: sugar in water, potassium permagnate in water.

13.Ans.

In first case when Rehan paddles:-

$$u = 0; v = 6 \text{ m/s}; t = 30 \text{ s}$$

$$\begin{aligned} a &= \frac{v - u}{t} \\ &= \frac{(6 - 0) \text{ m/s}}{30 \text{ s}} = 0.2 \text{ m/s}^2 \end{aligned}$$

In second case when brakes are applied:-

$$u = 6 \text{ m/s}; v = 4 \text{ m/s}; t = 5 \text{ s}$$

$$\begin{aligned} a &= \frac{v - u}{t} \\ &= \frac{(4 - 6) \text{ m/s}}{5 \text{ s}} \\ &= -0.4 \text{ m/s}^2 \end{aligned}$$

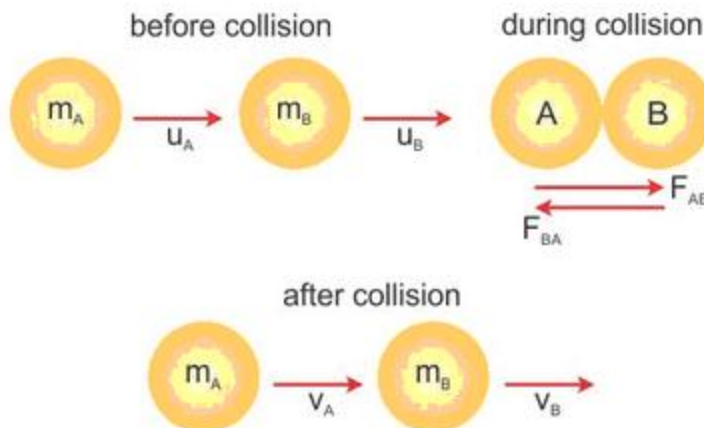
14.Ans.

According to the law of conservation of momentum,

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

$$\begin{aligned} m_1 u_1 + m_2 u_2 &= m_1 v_1 + m_2 v_2 \\ 0.1 \times 2 + 0.2 \times 1 &= 0.1 \times 1.67 + 0.2 \times v_2 \\ 0.2 + 0.2 &= 0.167 + 0.2 v_2 \\ v_2 &= \frac{0.2 + 0.2 - 0.167}{0.2} = \frac{0.233}{0.2} \\ &= 1.165 \text{ ms}^{-1} \end{aligned}$$

15.Ans.



Consider balls A and B of masses m_A and m_B 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:

$$F_{AB} = \text{Rate of change of momentum of B} = \frac{m(v_B - u_B)}{t}$$

Force exerted by B on A is:

$$F_{BA} = \text{rate of change of momentum of A} = \frac{m(v_A - u_A)}{t}$$

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

According to Newton's 3rd law action and reaction are equal 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.

16.Ans.

Let M and m be the masses of earth and 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 apple $a_{(\text{apple})} = \frac{F}{m} = \frac{GM}{r^2}$

Acceleration produced in earth

$$a_{(\text{earth})} = \frac{F}{M} = \frac{Gm}{r^2}$$

$$\frac{a_{\text{earth}}}{a_{\text{apple}}} = \frac{m}{M}$$

As $m \ll M$ hence $a_{(\text{earth})} \ll \ll a_{(\text{apple})}$

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

17.Ans.

Functions of Golgi apparatus:

- (i) Material synthesized near ER is packaged and dispatched to various targets inside and outside the cell through golgi apparatus.
- (ii) Its function is storage, modification and packaging of products.
- (iii) Complex sugars are made from simple sugars.
- (iv) Formation of lysosomes. (Any three functions)

18.Ans.

a) Squamous epithelium b) Cuboidal epithelium c) Glandular epithelium

19.Ans.

- (i) Providing shelter facilities under well ventilated roofed sheds.
- (ii) Proper cleaning with the floor slightly sloping.
- (iii) Regular brushing to remove dirt and loose hair.
- (iv) Food requirement which includes balanced ratios containing fibre, roughage and concentrates.
- (v) Special food during lactation period.
- (vi) Check against external parasites and skin check against internal parasites like norms and flukes.
- (vii) Vaccination against viral and bacterial diseases.

(Any six points)

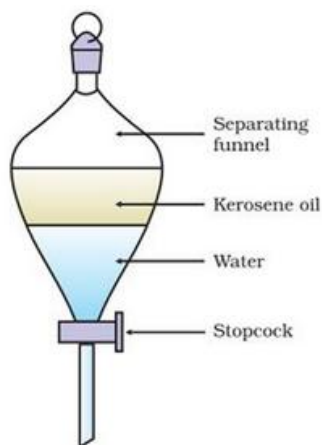
20. Ans.

(a)

- (i) Fractional distillation
- (ii) Chromatography
- (iii) Centrifugation
- (iv) Sublimation

(b) Some impurities may remain dissolved in the solution and on evaporation these contaminate the solid so crystallization is a better technique.

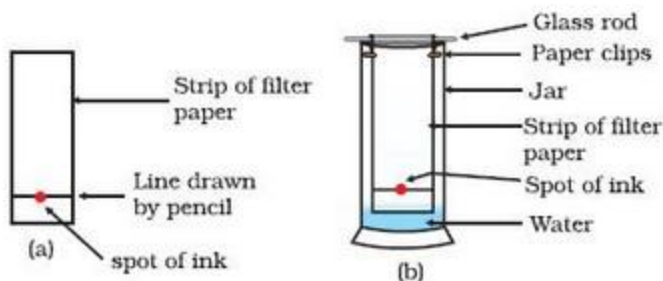
(c) Separation of immiscible liquids.



Method:

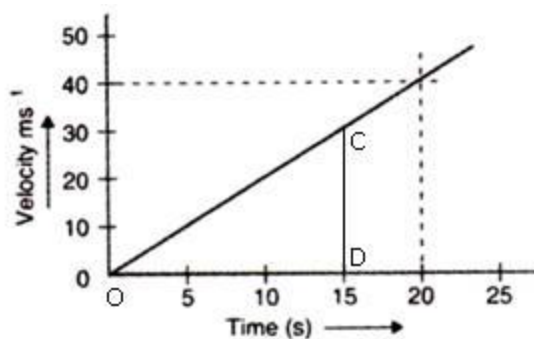
1. Take a thin strip of filter paper.
2. Draw a line on it using a pencil approx. 3 cm above the lower edge.
3. Put a small drop of ink with help of a pen at centre of line and let it dry.
4. Lower the filter paper into a glass jar containing water in such a way that the ink's drop remains just above the water level. Leave it undisturbed.
5. Water rises up in the filter paper. Ink drop splits up into its constituents.

Conclusion: Dye in black ink is a mixture of 2 or 3 colours. The coloured component that is more soluble in water rises faster and in this way the colours get separated.



21.Ans.

- (a) Uniformly accelerated motion.
- (b) Acceleration of the object.
- (c) Distance travelled by the object.
- (d)



Distance = area of rt. triangle ODC.

$$= \frac{1}{2} b \times h = \frac{1}{2} \times (15 \text{ s}) \times (30 \text{ ms}^{-1})$$

$$= 225 \text{ m}$$

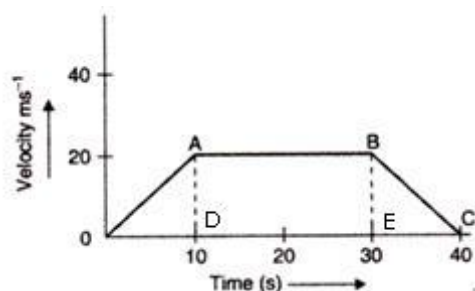
Or

- (a) OA-uniform acceleration, AB-zero acceleration/constant velocity.
- (b) Velocity after 10s = 20 ms⁻¹

Velocity after 40s = zero (body comes to rest)

(c) Retardation = $\frac{(0 - 20) \text{ ms}^{-1}}{(40 - 30) \text{ s}} = -2 \text{ ms}^{-2}$

(d)



Distance between 10th and 30th second = area of rectangle ABDE

$$\begin{aligned}
 &= (30 - 10) \text{ s} \times 20 \text{ m s}^{-1} \\
 &= 20 \text{ s} \times 20 \text{ m s}^{-1} \\
 &= 400 \text{ m}
 \end{aligned}$$

22. Ans.

- (a) It is the property of a body to remain in its state of rest or of uniform motion unless it is acted upon by an unbalanced force. Steel ball having highest density will have highest mass and hence the highest inertia.
- (b) Make a pile of similar carom coins on a table. Attempt a sharp horizontal hit at the bottom of the pile using another carom coin or the striker. If the hit is strong enough, the bottom coin moves out quickly. Once the lowest coin is removed, the inertia of the other coins makes them 'fall' vertically on the table.

Or

- (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, rate of change of momentum is directly proportional to 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, $F = ma$

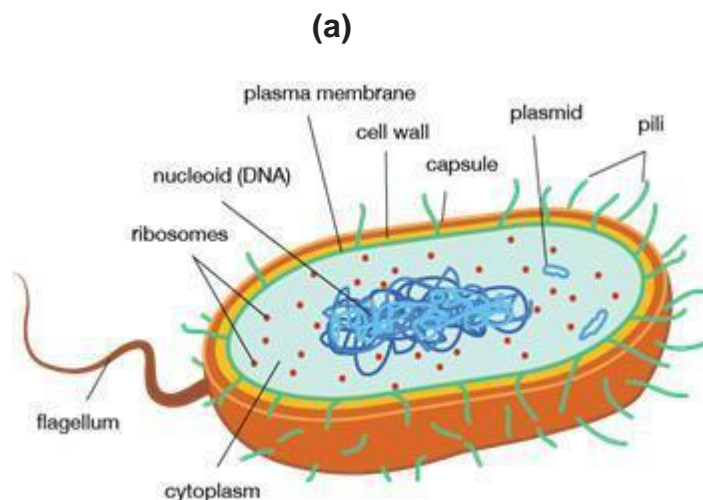
- (b) One Newton is defined as the amount of force exerted on a body of mass 1kg to produce an acceleration of 1m/s^2 .

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

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

\therefore 4kg mass at 2m/s^2 require a greater force.

23.Ans



(b) In bacteria, the nuclear region is poorly developed due to absence of a nuclear membrane. Such undefined nuclear region containing only nucleic acids is called nucleoid. The organisms which have nucleoid and do not have membrane bound cell organelles are called prokaryotes.

Or

(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 cell is placed in hypotonic solution, it swells up due to osmotic entry of water into it.

When the cell is placed in 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.

24.Ans

(a) The period of milk production after the birth of a calf is called lactation period.

Jersey, Brown Swiss

Local breeds show excellent resistance to diseases. The two can be cross breed to get animals with both the desired qualities.

(b) Roughage is largely fibrous food.

Concentrates are low in fiber and contain relatively high levels of proteins.

Or

(a) Manures are natural fertilizers, which contain organic matter and prepared by decomposed animal waste and vegetative waste.

Type of manure:

(i) Compost and

(ii) Vermicompost

(iii) Green manure

Limitations of manures:

(i) Manure is not a nutrient specific.

(ii) It supplies small quantities of nutrients to the soil.

(b)

(i) Organic matter in soil is not replenished which makes the soil infertile.

(ii) Micro-organisms in the soil are destroyed.

Section B

- 25. Ans.** The temperature remains constant since the heat is used up in overcoming the forces of attraction between the particles.
- 26. Ans.** Only iron filings gets attracted towards magnet because of the magnetic properties of iron.
- 27. Ans.** Ferrous sulphide is formed.
- 28. Ans.** Sand since it is immiscible with water and is separated by filtration.
- 29. Ans.** First rises and then becomes constant. As soon as the boiling point is reached; the temperature becomes constant and doesn't rise as now the heat is used up in converting the liquid to vapour.
- 30. Ans.** B, since sugar dissolves completely in water to form a true solution..
- 31. Ans.**
 Marble powder since common salt dissolves in water and ammonium chloride being volatile in nature gets evaporated to vapours.
- 32. Ans.** Heating the solid mixture in a china dish covered with inverted funnel since ammonium chloride being a volatile compound sublimes leaving behind the salt.
- 33. Ans.** In accordance with Newton's 3rd law of motion, the wall also exerts an equal and opposite force on the man i.e. 30 N
- 34. Ans.** Action and reaction forces are always equal and opposite.
- 35. Ans.** To prepare a temporary stained mount of onion peel, a student must take the material from thin layer of fleshy leaf base of onion.
- 36. Ans.** Because collenchyma tissues have cells thickened at the corners and have little intercellular space.

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

38. Ans. Because it stains the plant cell nucleus.

39. Ans. Cell body with branched cytoplasmic extensions at one end and long projection at the other end; The branched cytoplasmic extensions at one end are called dendrites and a long projection at the other end is called axon.

40. Ans.

Plasma membrane, cytoplasm, nucleus. Human cheek cell is an animal cell which shows clearly plasma membrane, cytoplasm and nucleus when mounted on a slide.

41. Ans. Because the dark stained nucleus and cell wall is seen.

42. Ans. Methylene blue is used to stain animal cells to make nuclei more visible.