Goa Board
Class IX Science
Term 1
Sample Paper - 2 Solution

Time: 3 hrs **Total Marks: 90**

SECTION A

1. **Ans.** In an open ground, the high speed of wind increases the rate of evaporation, and hence, wet clothes dry up faster.

2. **Ans.** The gravitational force between the Earth and a body is known as the weight of the body or the force of gravity.

3. **Ans.** Cellulose is a complex substance and provides structural strength to plants.

4. **Ans.** According to Newton's II law: F = ma

$$F = \frac{m(v-u)}{t}$$

Ft = mv – mu
If F = 0, v = u
i.e. the object continues to move with uniform velocity.
If F = 0 and u = 0, v is also 0
i.e. the object will remain at rest.
This is Newton's first law of motion according to which an object at rest or uniform motion tends to remain at rest or in uniform motion unless an unbalanced forced acts on it.

5. **Ans.** The sedimentation and decantation methods are used to separate a mixture containing an insoluble solid in a liquid. In this method, the mixture is allowed to stand undisturbed for some time. The insoluble solid substance settles down and a clear liquid is left standing. This clear liquid is called a supernatant liquid. The solid substance which settles down is called sediment. This entire process is known as sedimentation. The clear water (supernatant liquid) is then poured out carefully into another beaker, leaving the sediments undisturbed. This process is known as decantation.

6. Ans.

(i) Drone
(ii) Broiler
(iii) Layer
(iv) Indigenous species

7. Ans.

Areolar Tissue	Adipose Tissue
(i) The cells of areolar tissue are of several types such as fibroblasts, mast cells, plasma cells and macrophages.	(i) The cells of adipose tissue are similar and are called adipocytes.
(ii) It is found between the skin and muscles, around blood vessels and nerves and in the bone marrow.	(ii) It is found below the skin and between internal organs.
(iii) It fills the space inside organs and supports internal organs.	(iii) It acts as a fat reservoir and insulator of heat.

8. Ans. Stomata are microscopic pores found mostly on the underside of leaves. They are located in the epidermal tissue. Each stoma is surrounded by a pair of specialised, kidney-shaped cells called guard cells, which possess chlorophyll and regulate the opening and closing of stomata. The primary function of stomata is to allow gaseous exchange during photosynthesis and respiration between the plant's internal tissues and the atmosphere. The process of transpiration also takes place through stomata.

9. Ans.

(i) The water vapour present in the air loses energy on coming in contact with the cold glass of water and gets converted to the liquid state, which can be seen as water droplets.
(ii) Cotton being a good absorber of water helps in absorbing sweat and exposing it to the atmosphere for easy evaporation, causing cooling of the body.
(iii) The sprinkled water evaporates by taking large latent heat of vaporisation from the roof or open ground and surrounding air, causing cooling of the place.

10. Ans. Two examples of compressed gases which are used in our daily life are

1. Liquefied petroleum gas (LPG): The LPG cylinder which we get in our home for cooking or the oxygen supplied to hospitals in cylinders is compressed gas.
2. Compressed natural gas (CNG): CNG is used as fuel these days in vehicles.
   Due to high compressibility, large volumes of a gas can be compressed into a small cylinder and transported easily.

11. Ans.

(i) An element is the basic form of matter which cannot be broken down into a simpler substance by usual chemical methods of applying heat, light or electric energy.

(ii) Water is not considered an element because it can be split up into its two simpler substances—hydrogen and oxygen—by electrolysis.

(iii) An alloy is considered a mixture because it shows the properties of its constituents and has a variable composition.

12. Ans.

(i) The concentration of a solution is the amount of solute present in a given quantity of the solution.

(ii) Given:

Mass percentage of solution = 20%

Mass of solution = 550 g

Mass of solute = m

Mass percentage of solution = (mass of solute/mass of solution) × 100

Therefore, mass of solute = (mass percentage of solution × mass of solution)/100

Substituting the values, we get

m = (20 × 550)/100

= 110 g

13. Ans. Let a stone A be allowed to fall from the top of a tower of height h = 100 m

Its initial velocity $u_1 = 0$

And $a_1 = +g = +10\ ms^{-2}$

Another stone B is projected upwards from the ground with an initial velocity $u_2 = 25\ ms^{-1}$ and for it $a_2 = -g = -10\ ms^{-2}$

Let the two stones meet at a point C at a distance y below A or (100 − y) above B after a time t.

Then for stone A

$$y = u_1 t + \frac{1}{2} a_1 t^2$$

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

$$y = 5 t^2 \quad \_\_\_\_\_(1)$$

For stone B

$$(100 - y) = u_2 t + \frac{1}{2} a_2 t^2$$

$$= 25 t + \frac{1}{2} \times (-10) \times t^2$$

$$= 25t - 5t^2$$

$$\text{or, } 100 - y = 25t - 5t^2 \quad \_\_\_\_\_(2)$$

Adding (1) and (2)

$100 = 25\ t$

$t = \frac{100}{25} = 4\ s.$

Substiting value of t in(1) we get

$y = 5 \times 4^2 = 80\,m$

The two stones will meet at a distance of 80 m from stone A or 20 m (100 – 80 = 20 m) from the ground at time t = 4 sec.

14. Ans.

Mass of the body = 5 kg, t = 2 sec, u = 3 m/s, v = 7 m/s

$$F = \frac{m(v-u)}{t}$$

$$F = \frac{5(7-3)}{2} = 10N$$

$$v = u + \frac{Ft}{m}$$

$$v = 3 + \frac{10 \times 5}{5} = 13m/s$$

The magnitude of the applied force = 10 N.

The final velocity of the object when a force of 10 N is applied on the object for a period of 5 s is 13 m/s.

15. Ans.

Given mass of the ball = 20 g

According to Newton's law,

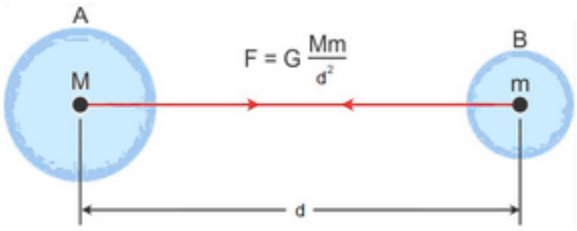
$$F = ma = \frac{m(v-u)}{t}$$

$$F = \frac{20 \times 10^{-3} kg(0-20) m s^{-1}}{10s}$$

$$= -4 \times 10^{-2} N$$

The negative sign indicates that it is an opposing force.

16. Ans. Every object in the 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 the distance between their centres. The direction of force is along the line joining the centres of two objects.



Consider two bodies A and B of masses M and m, respectively, and let 'd' be the distance between their centres. Let F be the force by which they mutually attract each other.

$F \propto M \times m$ (i)

$F \propto 1/d^2$ (ii)

Combine (i) and (ii)

$$F \propto \frac{M \times m}{d^2}$$

$$F = G\frac{M \times m}{d^2}$$

G is universal gravitation constant.

17. Ans.

Plant cell	Animal cell
(i) Cell wall is present. (ii) Plastids are present. (iii) A single large vacuole is present at the centre.	(i) Cell wall is absent. (ii) Plastids are absent. (iii) Numerous small vacuoles are present.

18. Ans. Green manuring is the practice of ploughing green plants into the soil for improving the fertility. Green manure provides organic matter and nutrients such as N and P to the soil. Commonly used green manure crops: Guar and Sunhemp. Macronutrients provided by green manure are nitrogen and phosphorus.

19. Ans.

(i) Mass of solute = 36 g

Mass of solvent = 100 g

Mass of solution = 100 + 36 = 136 g

$$\text{Concentration of solution} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

$$= \frac{36}{136} \times 100$$

$$= 26.47\%$$

(ii) If the temperature increases, solubility increases, and if the temperature decreases, solubility decreases.

(iii) It is possible to distinguish the particles of a solute from those of a solvent in a suspension because the particle size is bigger in suspensions; hence, it is easier to distinguish the particles of a solute.

20. Ans. Three characteristics of particles of matter are

1. Particles of matter have space between them. Example: When we make tea or coffee, the particles of one type of matter get into the spaces between the particles of the other. This shows that there is enough space between the particles of matter.
2. Particles of matter are continuously moving. Example: When we light an incense stick, we can get the smell sitting at a distance indicating that the particles are continuously moving.
3. Particles of matter attract each other. Example: If we try breaking the stream of water from a tap with our fingers, we are not able to cut the stream and this suggests that particles of matter have a force of attraction acting between them.

The characteristics responsible for the following are

(i) Spreading of smell of scent in a room is due to diffusion.

(ii) Being fluid, it has no shape; hence, water takes the shape of the vessel in which it is poured.

21. Ans.

$u = 0,\ a = 2\ m/s^2,\ t = 10\ s$

$v = u + at$

$= 0 + 2 \times 10 = 20\ m/s$ after 10 sec.

For next 20 s, (i.e., form 10 s to 30 s), $v = 20\ m/s$

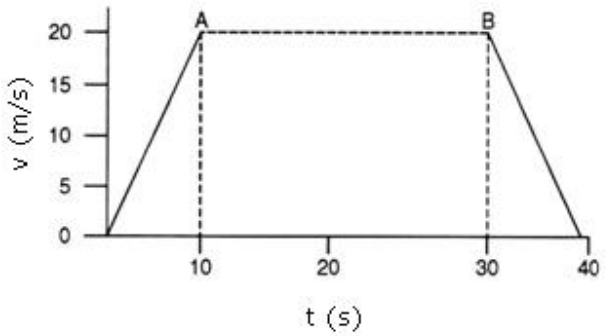
Negative acceleration $= -2\ m/s^2$ acts till body comes to rest. Here

$u = 20\ m/s,\ a = -2\ m/s^2,\ v = 0$

$v = u + at$

$0 = 20 + (-2) \times t$

or $t = \frac{20}{2} = 10\ s$



22. Ans.

(i) Second law of motion: The rate of change of linear momentum of a body is directly proportional to the external force applied on the body, and this change takes place always in the direction of the applied force.

$$F \propto \frac{m(v-u)}{t}$$

$$F \propto ma$$

$$F = Kma$$

$$\text{if } k = 1$$

$$F = ma$$

$$1N = 1\,kg \times 1\,ms^{-2}$$

One Newton force is that much force which produces an acceleration of 1 m/s^2 in a body of mass one kilogram.

(ii) Law of conservation of momentum: The sum of momentum of the two objects before collision is equal to the sum of momentum after collision provided there is no external unbalanced force acting on them.

Recoil of a gun:

Let m_1 = mass of shell, m_2 = mass of gun

Before firing, both the gun and the shell are at rest; therefore, total momentum of bullet and shell = 0

On firing, let v_1 = velocity of the shell, v_2 = velocity of gun

Total momentum on firing = $m_1v_1 + m_2v_2$

Applying the law of conservation of momentum, we have

$$m_1v_1 + m_2v_2 = 0$$

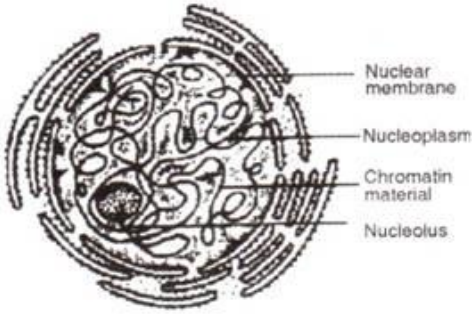
$$v_2 = -\frac{m_1v_1}{m_2}$$

The negative sign shows that v_2 is in a direction opposite to v_1, i.e. the gun recoils when the shell moves forward.

As $m_2 >> m_1$; therefore, $v_2 << v_1$, i.e. as the gun is much heavier than the bullet, the recoil velocity of the gun is much smaller than the velocity of the bullet.

23. Ans.

(i)



(ii) The nucleus is covered by a double porous nuclear membrane. It has entangled mass of thread-like structures called chromatin material. It has nucleolus and nucleoplasm. Chromatin fibres get changed into prominent rod-shaped chromosomes during the cell division process. Chromosomes are made of DNA and proteins. Functional segments of DNA are called genes. DNA contains the information for constructing and organising cells.

(iii)

(i) The nucleus controls all the chemical activities of the cell.

(ii) It plays an important role in cellular reproduction. It transfers characters from the parent cell to the daughter cell through genes.

24. Ans. Irrigation is important to ensure that crops get water at the right stages during growth.

The different kinds of irrigation systems adopted to supply water to agricultural lands are

(i) Wells: There are two types of wells—dug wells and tube wells. In a dug well, water is collected from water-bearing strata. Tube wells can tap water from the deeper strata.

(ii) Canals: This is an elaborate and extensive irrigation system. In this system, canals receive water from one or more reservoirs or from rivers.

(iii) River lift system: In areas where canal flow is insufficient or irregular due to inadequate reservoir release, the lift system is more rational.

(iv) Tanks: These are small storage reservoirs, which intercept and store the run-off smaller catchment areas.

SECTION B

25. **Ans.** B. Volatile solids from non-volatile solids, because on heating, the volatile solid will sublime and get converted to gaseous state leaving behind the non-volatile solid.

26. **Ans.** A. Milk churned with water, because milk and water both are in the liquid state.

27. **Ans.** C. Sand is spread on ice-covered roads to increase the friction of the surface and make it less slippery.

28. **Ans.** A. The maximum value of the force of friction beyond which it can no longer increase and the body just begins to move is called limiting friction or the limiting force of friction.

29. **Ans.** D. Tur dal contains metanil yellow as an adulterant.

30. **Ans.** B. Raisins absorb water by imbibition because the concentration of sugar is higher in raisins.

31. **Ans.** D. Both striated and cardiac muscles have light and dark bands.

32. **Ans.** A. Parenchyma cells are unspecialised with thin cell walls. They have large vacuoles and are of various shapes.

33. **Ans.** D. The ratio of the limiting friction and normal reaction is known as coefficient of friction.

34. **Ans.** Based on the following observations, the slide describes that the striated muscle fibres have long, cylindrical cells with striations, i.e. light and dark bands.

35. **Ans.** Figure III is the correct setup to determine the melting point of ice. Only in this setup, the bulb is inside the crushed ice and the thermometer is straight to give the correct melting point.

36. **Ans.** The weight of the object is 20 N. The principle of working of the spring balance is based on Newton's third law of motion which states: 'To every action, there is always an equal and opposite reaction and they act on two different bodies'.