ANSWERS

Multiple Choice Questions

1. (a)

2. (b)

3. (c)

4. (c)

5. (a)

6. (c)

7. (d)

8. (d)

9. (c)

10. (c)

11. (d)

12. (d)

13. (c)

14. (c)

15. (d)

16. (c)

Short Answer Questions

17. The correct option is (d). Since ice and water are in equilibrium, the temperature would be zero. When we heat the mixture, energy supplied is utilised in melting the ice and the temperature does not change till all the ice melts because of latent heat of fusion. On further heating the temperature of the water would increase.

18. This element is a metal. Other characteristics that the element may possess are–lustre, malleability, heat and electrical conductivity.

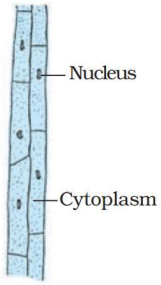
19.

	Valency	Atomic No.	Mass No.
X	3	5	11
Y	2	8	18
Z	3,5	15	31

20. + 1

21. (b), Onion peel has cell wall and RBC does not have cell wall

22. **Hint—**Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres.

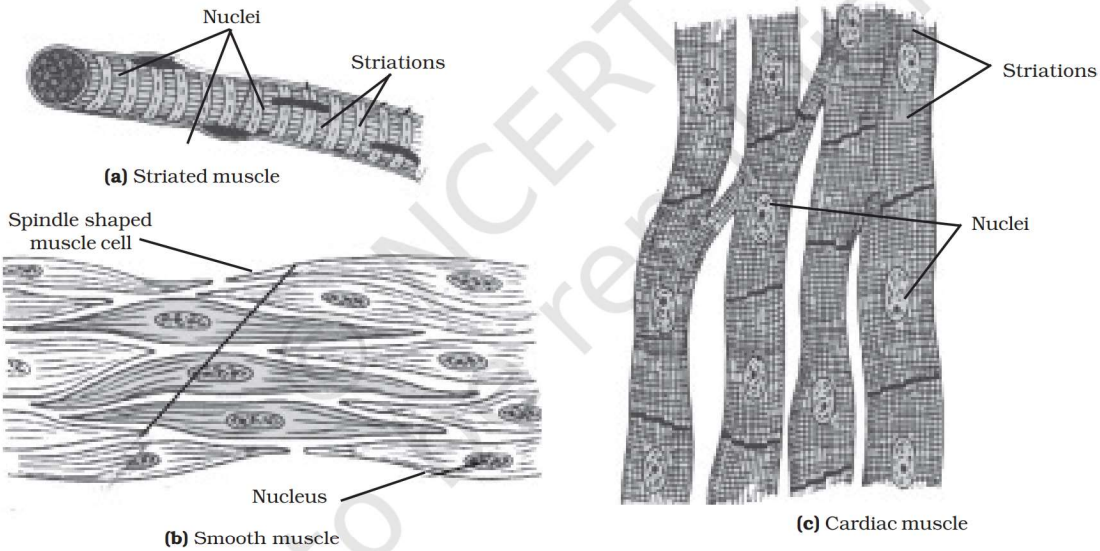


Xylem parenchyma

23. *Spongilla* —Acoelomate
Sea anemone—Acoelomate
Planaria—Acoelomate
Liver fluke—Acoelomate
Wuchereria—Pseudocoelomate
Ascaris—Psudocoelomate
Nereis—Coelomate
Scorpion—Coelomate
Earthworm—Coelomate
Birds, Fishes and Horse—Coelomate

24. **Hint—** Nucleus

25.



(a) Striated muscle

(b) Smooth muscle

(c) Cardiac muscle

26. (a) Since velocity is not changing, acceleration is equal to zero.
(b) Reading the graph, velocity = 20 m s^{-1}
(c) s = area of the figure enclosed under $v - t$ graph
Distance covered in 15 s, $s = u \times t$
$= 20 \times 15 = 300$ m

27. Total energy of the ball $= m \times g \times h$

$= m \times 10 \times 10 = 100\ m$

$= 100\ m\,\text{kg} \times \text{m}^2\ \text{s}^{-2}$

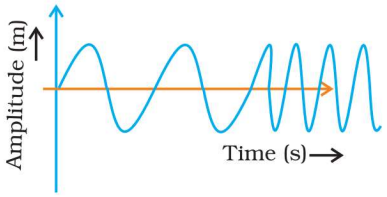
Energy with which it struck the ground = 60% of the total energy

$$E = \frac{60}{100} \times 100 m \text{ kg m}^2 \text{ s}^{-2}$$

$\therefore$ Height to which the ball will bounce back

$$h = \frac{E}{m \times g} = 6\,\text{m}$$

28.



29. **Hint—** It is a bio-indicator and sensitive to SO_2 pollution from automobiles. Delhi has maximum number of automobiles, hence has a highly polluted environment.

30. Lichens release chemical substances to break the rocks into smaller particles and hence make soil.

31. Crop which has been developed by introducing new gene from any other source, to obtain the desired character, is called as genetically modified (GM) crop. Bt Cotton is an example of GM crop which is made insect-resistant by introducing a new gene from a bacteria.

32. Farmers of low rainfall area will be suggested to

(a) practice farming with drought resistant and early maturing varieties of crops.

(b) to enrich the soil with more humus content as it increases the water-holding capacity and retains the water for longer duration.

33. In agricultural practices, higher input gives higher yield, means higher money input raise the yield. Financial conditions of the farmers allows them to take up different farming practices and technologies. The farmer's purchasing capacity for input decides cropping system and production practices.

Long Answer Questions

34. One mole of screws weigh 2.475×10^{24}g

$= 2.475 \times 10^{21}$ kg

$$\frac{\text{Mass of the earth}}{\text{Mass of 1 mole of screws}} = \frac{5.98 \times 10^{24}\,\text{kg}}{2.475 \times 10^{21}\,\text{kg}} = 2.4 \times 10^{3}$$

Mass of earth is 2.4×10^3 times the mass of screw

The earth is 2400 times heavier than a mole of screw.

Or

$$6CO_2 + 6\,H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2$$

1 mole of glucose needs 6 moles of water

180 g of glucose needs (6×18) g of water

1 g of glucose will need $\frac{108}{180}$ g of water.

18 g of glucose would need $\frac{108}{180} \times 18$ g of water

$= 10.8$ g

Volume of water used $= \frac{\text{Mass}}{\text{Density}} = \frac{10.8\,\text{g}}{1\,\text{g cm}^{-3}} = 10.8\ \text{cm}^3$.

35. (a) Food is necessary for the growth and development of the body. Balanced diet provides raw materials and energy in appropriate amount needed for the substances likes proteins, carbohydrates, fats, minerals etc which in turn are essential for the proper growth and functioning of the healthy body.

(b) Health is a state of being well enough to function well physically, mentally and socially and these conditions depend upon the surrounding environmental conditions. For example, if there is unhygienic conditions in surrounding area, it is likely we might get infected or diseased.

(c) This is so because many water borne diseases and insect vectors flourish in stagnant water which cause diseases in human beings.

(d) Human beings live in societies and different localities like villages or cities, which determines the social and physical environment and hence both are to be kept in harmony. Public cleanliness is important for individual health. For better living conditions lot of money is required. We need good food for healthy body and for this we have to earn more. For the treatment of diseases also, one has to be in good economic condition.

Or

AIDS causing virus— HIV that comes into the body via, the sexual organs or any other means like blood transfusion will spread to lymph nodes all over the body. The virus damages the immune system of the body adversely. Due to this the body can no longer fight off many minor infections. Instead, every small cold can become pneumonia, or minor gut infection can become severe diarrhoea with blood loss. The effect of disease becomes very severe and complex, at times killing the person suffering from AIDS. Hence there is no specific disease symptoms for AIDS but it results in complex diseases and symptoms. Therefore, it is known as syndrome.

36. (a) **Hint—** Explain inertia with certain examples

(b) Yes, the balls will start rolling in the direction of the displacement of the train.

No, they will not move with the same speed, because their masses (inertia) are different. The lighter ball will move faster than the heavier ball.

Or

(a) Yes, it is not an example of conservation of momentum because momentum remains conserved when no external force is acting on the object. In this case, force of gravity is acting on the ball.

(b) $m_1 = 20\ \text{g} = \dfrac{20}{1000} = \dfrac{1}{50}\ \text{kg}$

$v_1 = 150\ \text{ms}^{-1}$

$m_2 = 2\ \text{kg}$

$v_2 =$ $\quad \because\ m_1 v_1 = m_2 v_2$

$$\therefore\ \frac{1}{50} \times 150 = 2 \times v_2$$

$$v_2 = \frac{150}{50 \times 2} = 1.5\ \text{m s}^{-1}$$

37. (a) Newton's Second Law of Motion $\quad F = m \times a \quad ; F = mg$

Universal Law of Gravitation $\quad F = \dfrac{G m M}{R^2}$

$$\therefore m g = \frac{G m M}{R^2},\ g = \frac{G M}{R^2}$$

(b) $g_e = g$ and $\quad g_m = g/6$

Force applied to lift a mass of 15 kg, at the earth $F = m g_e = 15\ g_e$ N

Therefore, the mass lifted by the same force on the moon,

$$m = F / g_m = \frac{15g}{g/6} = 90\ \text{kg}$$

Or

(a) We know that the value of 'g' at the equator of the earth is less than that at poles. Therefore, the packet falls slowly at the equator in comparison to the poles. Thus, the packet will remain in air for longer time interval, when it is dropped at the equator.

(b) The apple also attracts the earth with equal and opposite force (Newton's Third Law).

$\therefore m_a g_a = m_E g_E$

As the mass of the apple is negligible when compared to the mass of earth, the acceleration produced in the apple will be much greater than that produced in the earth.

38. Infra-red radiations in sunlight pass through the glass and heat the interior of the car. The radiation emitted by upholstry and other inner parts of the car cannot pass out of the glass, so the heat trapped inside raises the temperature of the interior. This is because glass is transparent to infra-red radiation from the sun having smaller wavelength than that emitted by the interior of the car which are of longer wavelength to which the glass is opaque.

Or

Water pollution can be caused by addition of

(i) undesirable substances like fertilisers and pesticides or any poisonous substances.

(ii) sewage directly entering a water body.

(iii) hot water from the power plant that increases the temperature and reduces the dissolved oxygen in water thus killing the aquatic organisms.

(iv) industrial effluents or radioactive substances in water body.

We can take following measures to check water pollution

(i) The sewer lines should not be directly connected to the water body.

(ii) We should not throw our garbages or domestic wastes into the water body.

(iii) Prevent dumping of toxic compounds in the water bodies.

(iv) Washing of clothes should be avoided near water bodies as it adds a lot of detergents to it.

(v) Plant trees near the banks of the river to check soil erosion otherwise erosion leads to siltation of water body.