

SCIENCE
CLASS IX (THEORY)
SAMPLE QUESTION PAPER-I

Time: 3 Hours

Maximum Marks : 75

Multiple Choice Questions

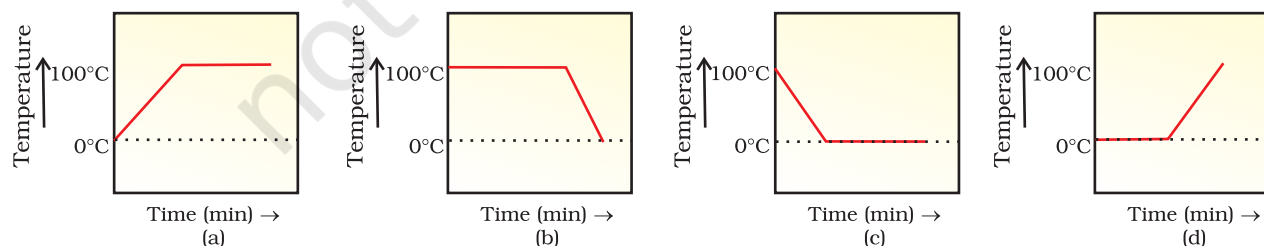
1. On converting 25 °C, 38 °C and 66 °C to kelvin scale, the correct answer will be
(a) 298 K, 311 K and 339 K
(b) 298 K, 300 K and 338 K
(c) 273 K, 278 K and 543 K
(d) 298 K, 310 K and 338 K (1)
2. Choose the correct statement of the following
(a) conversion of solid into vapours without passing through the liquid state is called vapourisation.
(b) conversion of vapours into solid without passing through the liquid state is called sublimation.
(c) conversion of vapours into solid without passing through the liquid state is called freezing.
(d) conversion of solid into liquid is called sublimation. (1)
3. Rusting of an article made up of iron is called
(a) corrosion and it is a physical as well as chemical change
(b) dissolution and it is a physical change
(c) corrosion and it is a chemical change
(d) dissolution and it is a chemical change (1)
4. Which of the following are homogeneous in nature?
(i) ice (ii) wood (iii) soil (iv) air
(a) (i) and (iii)
(b) (ii) and (iv)
(c) (i) and (iv)
(d) (iii) and (iv) (1)
5. Following are a few definitions of osmosis
Read carefully and select the correct definition
(a) Movement of water molecules from a region of higher concentration to a region of lower concentration through a semipermeable membrane
(b) Movement of solvent molecules from its higher concentration to lower concentration

- (c) Movement of solvent molecules from higher concentration to lower concentration of solution through a permeable membrane
- (d) Movement of solute molecules from lower concentration to higher concentration of solution through semipermeable membrane.
- 6.** Which among the following has specialised tissue for conduction of water?
- (a) Thallophyta
- (b) Bryophyta
- (c) Pteridophyta
- (d) Fungi (1)
- 7.** Which of the following is not a criterion for classification of living organisms?
- (a) Body design of the organism
- (b) Ability to produce one's own food
- (c) Membrane bound nucleus and cell organelles
- (d) Height of the plant (1)
- 8.** Which of the following is not important for individual's health?
- (a) Living in clean space
- (b) Good economic condition
- (c) Social equality and harmony
- (d) Living in a large and well furnished house (1)
- 9.** Chromosomes are made up of
- (a) DNA only
- (b) protein only
- (c) DNA and protein
- (d) RNA only (1)
- 10.** A particle is moving in a circular path of radius (r). The displacement after half a circle would be
- (a) Zero
- (b) πr
- (c) $2r$
- (d) $2\pi r$ (1)
- 11.** In case of negative work the angle between the force and displacement is
- (a) 0°
- (b) 45°
- (c) 90°
- (d) 180° (1)
- 12.** An object moving at a speed greater than that of sound is said to be moving at
- (a) infrasonic speed
- (b) sonic speed
- (c) ultrasonic speed
- (d) supersonic speed (1)

- 13.** Before playing the orchestra in a musical concert, a sitarist tries to adjust the tension and pluck the string suitably. By doing so, he is adjusting
- intensity of sound only
 - amplitude of sound only
 - frequency of the sitar string with the frequency of other musical instruments
 - loudness of sound
- (1)
- 14.** Ozone - layer is getting depleted because of
- excessive use of automobiles
 - excessive formation of industrial units
 - excessive use of man-made compounds containing both fluorine and chlorine
 - excessive deforestation.
- (1)
- 15.** To solve the food problem of the country, which among the following is necessary?
- Increased production and storage of food grains.
 - Easy access of people to the food grain.
 - People should have money to purchase the grains.
 - All of the above.
- (1)
- 16.** Which one of the following nutrients is not available in fertilizers?
- Nitrogen
 - Phosphorus
 - Iron
 - Potassium
- (1)

Short Answer Questions

- 17.** A student heats a beaker containing ice and water. He measures the temperature of the contents of the beaker as a function of time. Which of the following would correctly represent the result? Give justification for your choice. (1+1= 2)

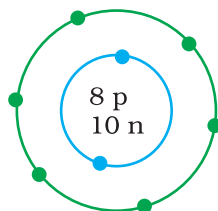


18. An element is sonorous and highly ductile. Under which category would you classify this element? What other characteristics do you expect the element to possess? $(\frac{1}{2} + 1\frac{1}{2} = 2)$

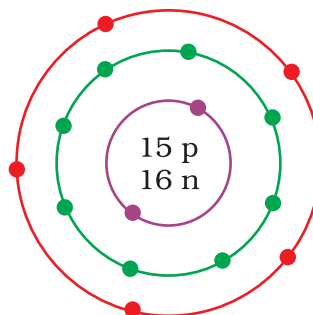
19. What information do you get from the following figures about the valency, atomic number and mass number of atoms X, Y and Z? Give your answer in a tabular form. $(1 + \frac{1}{2} + \frac{1}{2} = 2)$



(X)



(Y)



(Z)

20. One electron is present in the outer most shell of the atom of an element X. What would be the nature and value of the charge on the ion formed if this electron is removed from the outer most shell? $(1 + 1 = 2)$

21. Cells of onion peel and RBC are separately kept in hypotonic solution, what among the following will take place? Explain the reason for your answer.

- Both the cells will swell.
- RBC will burst easily while cells of onion peel will resist the bursting to some extent.
- a and b both are correct
- RBC and onion peel cells will behave similarly. $(\frac{1}{2} + 1\frac{1}{2} = 2)$

22. Name the different components of xylem and draw a living component of it.

$$(1 + 1 = 2)$$

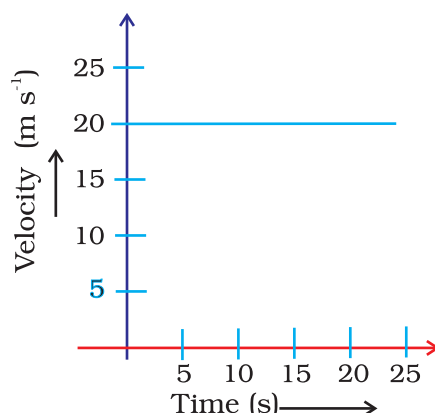
23. Classify the following organisms based on the absence/presence of true coelom (i.e. acoelomate, pseudocoelomate and coelomate)

<i>Spongilla</i> ,	Sea anemone	
Planaria,	Liver fluke	
<i>Wuchereria</i> ,	<i>Ascaris</i>	
<i>Nereis</i> ,	Scorpion	
Earthworm,	Birds	
Fishes,	Horse	(2)

24. Which cell organelle controls most of the activities of the cell? (2)

25. Draw well labelled diagrams of various types of muscles found in human body (2)

26. The following velocity-time graph shows the motion of a cyclist. Find (i) its acceleration, (ii) its velocity and (iii) the distance covered by the cyclist in 15 seconds.



$$(\frac{1}{2} + \frac{1}{2} + 1 = 2)$$

27. A ball is dropped from a height of 10 m. If the energy of the ball reduces by 40% after striking the ground, how much high can the ball bounce back? (2)
28. Draw a graph for a wave representing wave disturbance and time for a sound changing from low pitch to high pitch, keeping the amplitude of the sound same. (2)
29. Why lichens do not occur in Delhi whereas they commonly grow in Manali or Darjeeling? (2)
30. Lichens are called pioneer colonisers of bare rock. How can they help in formation of soil? (2)
31. What is a GM crop? Name any one such crop which is grown in India. (1+1= 2)
32. If there is low rainfall in a village throughout the year what measures will you suggest to the farmers for better cropping? (2)
33. In agricultural practices, higher input gives higher yield. Discuss how? (2)

Long Answer Questions

34. The mass of one steel screw is 4.11 g. Find the mass of one mole of these steel screws. Compare this value with the mass of the Earth (5.98×10^{24} kg). Which one of the two is heavier and by how many times?

$$(1\frac{1}{2} + 2\frac{1}{2} + 1 = 5)$$

Or

In photosynthesis, 6 molecules of carbon dioxide combine with an equal number of water molecules through a complex series of reactions to give a molecule of glucose having a molecular formula $C_6H_{12}O_6$. How many grams

of water would be required to produce 18 g of glucose? Compute the volume of water so consumed assuming the density of water to be 1 g cm^{-3} .

$$(4 + 1 = 5)$$

35. Explain giving reasons

- (a) Balanced diet is necessary for maintaining healthy body.
- (b) Health of an organism depends upon the surrounding environmental conditions.
- (c) Our surrounding area should be free of stagnant water.
- (d) Social harmony and good economic conditions are necessary for good health.

$$(1 + 1 + 1 + 2 = 5)$$

Or

Why is AIDS considered to be a 'Syndrome' and not a disease? (5)

36. (a) Explain the meaning of inertia with the help of an example.

- (b) Two balls of same size but of different materials, rubber and iron are kept on the smooth floor of a moving train. The brakes are applied suddenly to stop the train. Will the balls start rolling? If so, in which direction? Will they move with the same speed? Give reasons for your answer.

$$(2 + \frac{1}{2} + \frac{1}{2} + 1 + 1 = 5)$$

Or

- (a) A ball of mass m is thrown vertically upward from the ground with an initial speed v , its speed decreases continuously till it becomes zero. Thereafter, the ball begins to fall downward and attains the speed v again before striking the ground. It implies that the magnitude of initial and final momentum of the ball are same. Yet, it is not an example of conservation of momentum. Explain why?

- (b) A bullet of mass 20 g is horizontally fired with a velocity 150 m s^{-1} from a pistol of mass 2 kg. What is the recoil velocity of the pistol?

$$(3 + 2 = 5)$$

37. (a) With the help of Second Law of Motion and the Universal Law of Gravitation derive an expression for acceleration due to gravity ' g '.

- (b) The weight of any person on the moon is about $1/6$ times that on the earth. He can lift a mass of 15 kg on the earth. What will be the maximum, mass, which can be lifted by the same force applied by the person on the moon?

$$(1+1+1+2=5)$$

Or

(a) Identical packets are dropped from two aeroplanes, one above the equator and the other above the north pole, both at height ' h '. Assuming all conditions are identical, will these packets take same time to reach the surface of the earth? Justify your answer.

(b) It is seen that a falling apple is attracted towards the earth. Does the apple also attract the earth? If so, we do not see the earth moving towards the apple. Why? (2 + 1 + 1 + 1 = 5)

38. A motor car, with its glass totally closed, is parked directly under the sun. The inside temperature of the car rises very high. Explain why? (5)

Or

What are the causes of water pollution? Discuss how can you contribute in reducing the water pollution. (2½ + 2½ = 5)

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.

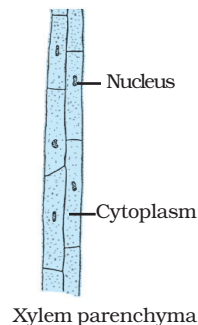
19.	Valency		Atomic No.	Mass No.
	X	3	5	11
	Y	2	8	18
	Z	3,5	15	31

20. + 1

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

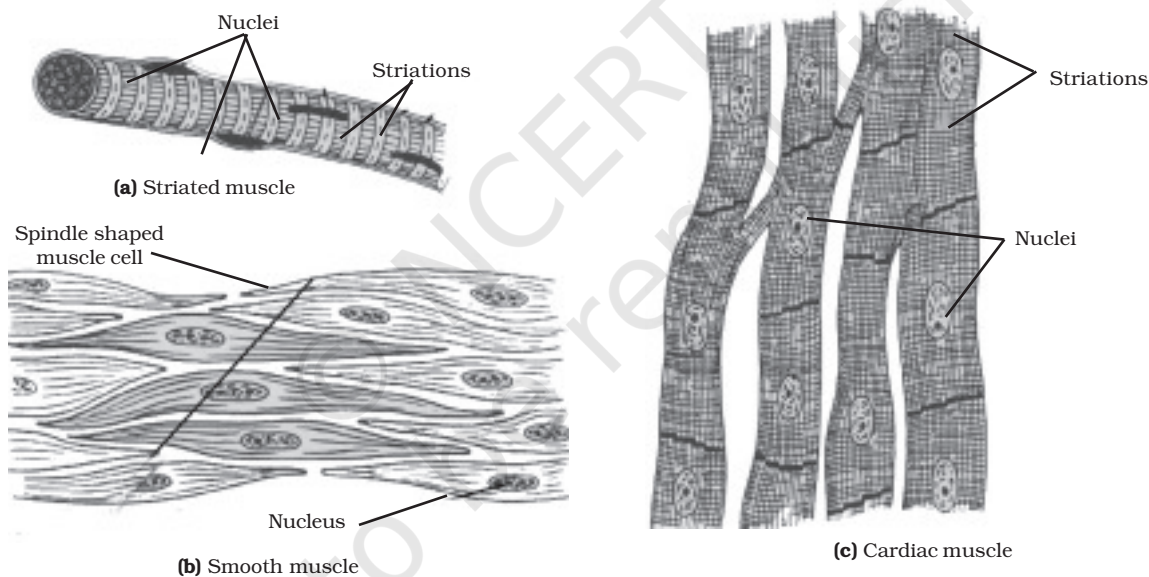
22. **Hint**—Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres.

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



24. **Hint**—Nucleus

25.



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, $s = u \times t$

$$= 20 \times 15 = 300 \text{ m}$$

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

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

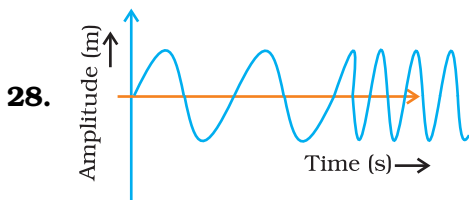
$$= 100 m \text{ kg} \times \text{m}^2 \text{ s}^{-2}$$

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

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



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 $2.475 \times 10^{24} \text{g}$
 $= 2.475 \times 10^{21} \text{ kg}$

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

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



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 $\frac{108}{180} \times 18 \text{ g of water}$
 $= 10.8 \text{ g}$

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 like 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) $m_1 = 20 \text{ g} = \frac{20}{1000} = \frac{1}{50} \text{ kg}$

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

$$m_2 = 2 \text{ kg}$$

$$v_2 = \quad \quad \quad \text{Q } m_1 v_1 = m_2 v_2$$

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

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

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

Universal Law of Gravitation

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

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

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

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