

**SCIENCE**  
**CLASS IX (THEORY)**  
**SAMPLE QUESTION PAPER - II**

**Time:** 3 Hours

**Maximum Marks :** 75

### Multiple Choice Questions

1. Seema visited a Natural Gas Compressing Unit and found that the gas can be liquefied under specific conditions of temperature and pressure. While sharing her experience with friends she got confused. Help her to identify the correct set of conditions.
  - (a) Low temperature, low pressure
  - (b) High temperature, low pressure
  - (c) Low temperature, high pressure
  - (d) High temperature, high pressure(1)
  
2. Which of the following are physical changes?
  - (i) Melting of iron metal
  - (ii) Rusting of iron
  - (iii) Bending of an iron rod
  - (iv) Drawing a wire of iron metal
  - (a) (i), (ii) and (iii)
  - (b) (i), (ii) and (iv)
  - (c) (i), (iii) and (iv)
  - (d) (ii), (iii) and (iv)(1)
  
3. Which one of the following has maximum number of atoms?
  - (a) 18 g of H<sub>2</sub>O
  - (b) 18 g of O<sub>2</sub>
  - (c) 18 g of CO<sub>2</sub>
  - (d) 18 g of CH<sub>4</sub>(1)
  
4. In a sample of ethyl ethanoate (CH<sub>3</sub>COOC<sub>2</sub>H<sub>5</sub>) the two oxygen atoms have the same number of electrons but different number of neutrons. Which of the following is the correct reason for it?
  - (a) One of the oxygen atoms has gained electrons
  - (b) One of the oxygen atoms has gained two neutrons
  - (c) The two oxygen atoms are isotopes
  - (d) The two oxygen atoms are isobars.(1)

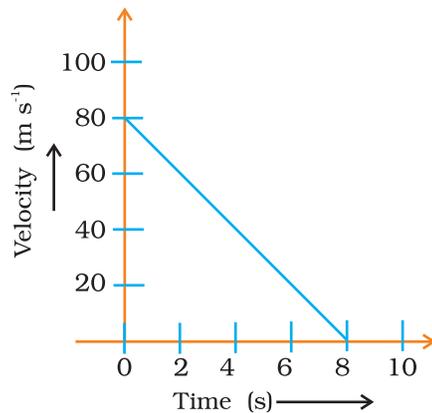
5. A cell will swell up if
- (a) the concentration of water molecules in the cell is higher than the concentration of water molecules in surrounding medium
  - (b) the concentration of water molecules in surrounding medium is higher than water molecules concentration in the cell.
  - (c) the concentration of water molecules is same in the cell and in the surrounding medium
  - (d) concentration of water molecules does not matter (1)
6. Survival of plants in terrestrial environment has been made possible by the presence of
- (a) intercalary meristem
  - (b) conducting tissue
  - (c) apical meristem
  - (d) parenchymatous tissue (1)
7. In which group of animals coelom is filled with blood?
- (a) Arthropoda
  - (b) Annelida
  - (c) Nematoda
  - (d) Echinodermata (1)
8. Organisms without nucleus and cell organelles belong to
- (a) fungi
  - (b) protista
  - (c) algae
  - (d) bacteria (1)
9. Which cells do not have perforated cell walls?
- (a) Tracheids
  - (b) Companion cells
  - (c) Sieve tubes
  - (d) Vessels (1)
10. The numerical ratio of displacement to distance covered by a moving object is
- (a) always less than 1
  - (b) always equal to 1
  - (c) always more than 1
  - (d) equal or less than 1 (1)
11. According to the third law of motion, action and reaction
- (a) always act on the same body
  - (b) always act on different bodies in opposite directions
  - (c) have same magnitude and direction
  - (d) act on either body at normal to each other (1)

- 12.** The value of acceleration due to gravity
- (a) is least on equator
  - (b) is least on poles
  - (c) is same on equator and poles
  - (d) increases from pole to equator (1)
- 13.** The gravitational force between two objects is  $F$ . If the masses of both objects are halved without changing distance between them, then the gravitational force would become
- (a)  $\frac{F}{4}$       (b)  $\frac{F}{2}$       (c)  $F$       (d)  $2F$  (1)
- 14.** Among the given options, which one is not correct for the use of large amount of fertilisers and pesticides?
- (a) They are eco-friendly
  - (b) They turn the fields barren after some time
  - (c) They remove the useful component from the soil
  - (d) They destroy the soil fertility (1)
- 15.** Find out the correct sentence
- (i) Hybridisation means crossing between genetically dissimilar plants.
  - (ii) Cross between two varieties is called as inter specific hybridisation.
  - (iii) Introducing genes of desired character into a plant gives genetically modified crop.
  - (iv) Cross between plants of two species is called as inter varietal.
- (a) (i) and (iii)  
(b) (ii) and (iv)  
(c) (ii) and (iii)  
(d) (iii) and (iv) (1)
- 16.** Find out the correct sentence about manure
- (i) Manure contains large quantities of organic matter and small quantities of nutrients.
  - (ii) It increases the water holding capacity of sandy soil.
  - (iii) It helps in draining out of excess of water from clayey soil.
  - (iv) Its excessive use pollutes environment because it is made of animal excretory waste.
- (a) (i) and (iii)  
(b) (i) and (ii)  
(c) (ii) and (iii)  
(d) (iii) and (iv) (1)

## Short Answer Questions

17. 'Osmosis is a special kind of diffusion'. Comment. (2)
18. Give the chemical formulae for the following compounds and compute the ratio by mass of the combining elements in each one of them.
- (a) Ammonia
  - (b) Carbon monoxide
  - (c) Hydrogen chloride
  - (d) Aluminium fluoride (1 + 1 = 2)
19. Write the molecular formulae for the following compounds
- (a) Aluminium (III) nitrate
  - (b) Calcium (II) phosphate
  - (c) Mercury (II) chloride
  - (d) Magnesium (II) acetate ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$ )
20. Helium atom has 2 electrons in its valence shell but its valency is not 2, Explain. (2)
21. If a person takes concentrated solution of salt. After sometime, he starts vomiting. What is the phenomenon responsible for such situation? Explain. (2)
22. Differentiate the following activities on the basis of voluntary or involuntary muscles.
- (a) Jumping of frog
  - (b) Pumping of the heart
  - (c) Writing with hand
  - (d) Movement of chocolate in your intestine ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$ )
23. Water hyacinth float on water surface. Explain. (2)
24. Which bacterium causes peptic ulcers?  
Who discovered the above pathogen for the first time? (1 + 1 = 2)
25. Give reasons for
- (a) Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole.
  - (b) Intercellular spaces are absent in sclerenchymatous tissues.
  - (c) We get a crunchy and granular feeling, when we chew pear fruit.
  - (d) Branches of a tree move and bend freely in high wind velocity. ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$ )
26. A motorcyclist drives from point A to point B with a uniform speed of 30 km h<sup>-1</sup> and returns back to point A with a uniform speed of 20 km h<sup>-1</sup>. Find the average speed of the motorcyclist. (2)

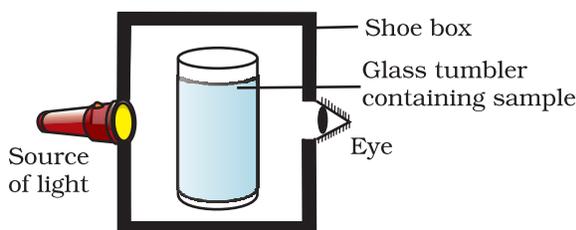
27. Velocity versus time graph of a ball of mass 50 g rolling on a concrete floor is shown below. Calculate the acceleration and the frictional force of the floor on the ball? (1 + 1 = 2)



28. The volume of a 500 g sealed packet is 350 cm<sup>3</sup>. Will the packet float or sink in a saturated salt solution, if the density of the solution is 1.2 g cm<sup>-3</sup>? What will be the mass of the solution displaced by this packet? (1 + 1 = 2)
29. Why step farming is common in hills? (2)
30. Fertile soil has lots of humus. Why? (2)
31. List out some useful traits in improved crop. (2)
32. Arrange these statements in correct sequence of preparation of green manure.
- (a) Green plants are decomposed in soil.
  - (b) Green plants are cultivated for preparing manure or crop plant parts are used.
  - (c) Plants are ploughed and mixed into the soil.
  - (d) After decomposition it becomes green manure. ( $\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 2$ )
33. An Italian bee variety *Apis mellifera* has been introduced in India for honey production. Write about its merits on other varieties. (2)

## Long Answer Questions

34. A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the sample taken in a beaker/glass tumbler as shown in the figure. They were amazed to see that milk taken in the glass was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it



- (a) Explain why the milk sample was illuminated. Name the phenomenon involved.
- (b) Same results were not observed with a salt solution. Explain.
- (c) Can you suggest two more solutions which would show the same effect as shown by the milk solution? (2 + 2 + 1 = 5)

**Or**

During an experiment the students were asked to prepare a 10% solution of sugar in water. Ramesh dissolved 10g of sugar in 100g of water while Sarika prepared it by dissolving 10g of sugar in water to make 100g of the solution.

- (a) Are the two solutions of the same concentration?
- (b) Compare the mass % of the two solutions. (1 + 4 = 5)

35. Why do some children fall ill more frequently than others living in the same locality? (5)

**Or**

Give any four factors necessary for a healthy person. (5)

36. Define power. How will you differentiate between kW and kW h? If the velocity of a ball is tripled, what will be the ratio of
- (a) its initial kinetic energy and final kinetic energy
- (b) initial momentum and final momentum. (1 + 1 + 1½ + 1½ = 5)

**Or**

Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it.

- (a) How much work the men do in lifting the box?
- (b) How much work do they do in just holding it?
- (c) Why do they get tired while holding it? ( $g = 10 \text{ m s}^{-2}$ ) ( $2 + 1\frac{1}{2} + 1\frac{1}{2} = 5$ )

- 37.** (a) Explain how 'echo' is produced.
- (b) What should be the minimum distance between the listener and the reflector to hear an echo of sound propagating with a speed  $v \text{ m s}^{-1}$ ?
- (c) Does the speed of sound increase or decrease on a hotter day? Justify.  
( $1\frac{1}{2} + \frac{1}{2} + 1 + 2 = 5$ )

**Or**

Establish the relationship between speed of sound, its wavelength and frequency. If speed of sound in air is  $340 \text{ m s}^{-1}$ , calculate.

- (a) wavelength when frequency is 256 Hz.
- (b) frequency when wavelength is 0.85 m. ( $2 + 1\frac{1}{2} + 1\frac{1}{2} = 5$ )

- 38.** How do fossil fuels cause air pollution? (5)

**Or**

Explain the role of the Sun in the formation of soil. (5)

## ANSWERS

### Multiple Choice Questions

1. (c)
2. (c)
3. (d)

Number of atoms =  $\frac{\text{Mass of substance}}{\text{Molar mass}} \times N_A \times \text{Number of atoms in the molecule}$

$$\therefore \text{(a) 18 g of water} = \frac{18}{18} \times N_A \times 3 = 3N_A$$

$$\text{(b) 18 g of oxygen} = \frac{18}{32} \times N_A \times 2 = 1.12N_A$$

$$\text{(c) 18 g of CO}_2 = \frac{18}{44} \times N_A \times 3 = 1.23N_A$$

$$\text{(d) 18 g of CH}_4 = \frac{18}{16} \times N_A \times 5 = 5.60N_A$$

4. (c)
5. (b)
6. (b)
7. (a)
8. (d)
9. (b)
10. (d)
11. (b)
12. (a)
13. (a)
14. (a)
15. (a)
16. (b)

## Short Answer Questions

**17.** Yes, it is true. In both the phenomena, there is movement of particles from region of higher concentration to that of lower concentration. However, in case of osmosis the movement of solvent is through a semi permeable membrane which is permeable only to water molecules.

**18.** (a)  $\text{NH}_3$                       (b)  $\text{CO}$                       (c)  $\text{HCl}$                       (d)  $\text{AlF}_3$   
           N:  $\text{H} \times 3$                       C:O                      H: Cl                      Al:  $\text{F} \times 3$   
           14:  $1 \times 3$                       12: 16                      1: 35.5                      27:  $19 \times 3$   
           14: 3                      3: 4                      2:71                      9: 19

**19.** (a)  $\text{Al}(\text{NO}_3)_3$   
 (b)  $\text{Ca}_3(\text{PO}_4)_2$   
 (c)  $\text{HgCl}_2$   
 (d)  $\text{Mg}(\text{CH}_3\text{COO})_2$

**20.** Helium atom has 2 electrons in its outermost shell and its duplet is complete. Hence the valency is zero.

**21. Hint—** Exosmosis in intestine causes dehydration

**22.** On the basis of voluntary muscles – a, c

On the basis of involuntary muscles– b, d

**23. Hint—** Due to aerenchyma present in the swollen petiole.

**24.** (i) *Helicobacter pylori*  
 (ii) Marshall and Warren.

**25. Hint—**

(a) No need of storage.  
 (b) Because they are lignified.  
 (c) Presence of stone cells (sclerenchyma)  
 (d) Presence of Collenchyma.

**26.** Let  $AB = x$

$$\text{So } t_1 = \frac{x}{30} \text{ and } t_2 = \frac{x}{20}$$

$$\text{Total Time} = t_1 + t_2 = \frac{5}{60}x$$

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{2x}{\frac{5x}{60}} = 24 \text{ kmh}^{-1}$$

27. Acceleration =  $\frac{v - u}{t} = \frac{80 - 0}{8} = 10 \text{ m s}^{-2}$

Force =  $m \times a = \frac{50}{1000} \times 10 = 0.5 \text{ N}$

28. Density of the sealed packet =  $\frac{m}{V} = \frac{500}{350} = 1.4 \text{ g cm}^{-3}$

As the density of the packet is greater than that of the saturated salt solution, the packet will sink.

Mass of the solution displaced = Volume of the packet  $\times$  Density of the solution.

=  $350 \times 1.2 = 420 \text{ g}$ .

29. **Hint**— This is practiced to check soil erosion through water currents on the slopes.

30. Fertile soils are rich in organisms that decompose dead organic matter forming humus. Humus gives minerals, absorbs water and makes soil porous.

31. Useful traits of improved crops are

- (a) higher yield
- (b) improved nutritional quality
- (c) resistance to biotic and abiotic stresses
- (d) change in maturity
- (e) wide range of adaptability
- (f) desired agronomic characteristics.

32. (b)  $\rightarrow$  (c)  $\rightarrow$  (a)  $\rightarrow$  (d)

33. Merits of Italian bee variety *Apis mellifera* are—

- (a) It stings less.
- (b) It has high honey collection capacity.
- (c) It stays in given beehive for long periods and breeds very well.

### Long Answer Questions

34. **Hint**— (a) Dilute milk solution is a colloid and would show Tyndall effect.

(b) Salt solution is a true solution and would not scatter light.

(c) Detergent solution, sulphur solution.

**Or**

(a) No.

$$(b) \text{ Mass\%} = \frac{\text{Mass of solute}}{\text{Mass of solute} + \text{Mass of solvent}} \times 100$$

Solution made by Ramesh

$$\text{Mass\%} = \frac{10}{10+100} \times 100 = \frac{10}{110} \times 100 = 9.09\%$$

Solution made by Sarika

$$\text{Mass\%} = \frac{10}{100} \times 100 = 10\%$$

- 35. Hint—** Due to poor immune system, some children fall ill frequently. Balanced diet and proper nutrition for healthy body is required to have a strong immune system.

**Or**

For a healthy person it is necessary that

- (a) The surrounding environment should be clean. Air and water borne diseases will not spread.
  - (b) Personal hygiene prevents infectious diseases.
  - (c) Proper, sufficient nourishment and food is necessary for good immune system of our body.
  - (d) Immunisation against severe diseases.
- 36.** Definition of power  
kW is the unit of power and kWh is the unit of energy.

(a)  $v_1 = v ; v_2 = 3v$

$$KE_1 = \frac{1}{2} mv^2$$

$$KE_2 = \frac{1}{2} m (3v)^2 = \frac{9}{2} mv^2$$

$$KE_1 : KE_2 = \frac{1}{2} mv^2 : \frac{9}{2} mv^2 = 1:9$$

(b)  $p_1 = mv ; p_2 = m \times 3v = 3mv$

$$p_1 : p_2 = mv : 3mv \\ = 1 : 3$$

**Or**

(a)  $F = 250 \text{ kg} \times g = 250 \times 10 = 2500 \text{ N}$

$s = 1 \text{ m}$

$W = F \cdot s = 2500 \text{ N m} = 2500 \text{ J}$

(b) Zero, as the box does not move at all while holding it.

(c) In order to hold the box men are applying a force which is opposite and equal to the gravitational force acting on the box. While applying the force men make muscular effort. So they get tired.

**37.** (a) Echo

(b)  $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$  that is,  $t = \frac{2d}{V}$

or  $d = \frac{V \times t}{2} = \frac{V \times 1}{2 \times 10} = \frac{V}{20} \text{ m}$     time = 0.1 s

(c) The speed of sound increases with temperature. So on a hotter day speed of sound is more.

**Or**

$v = v \lambda$  (Derivation)

(a)  $340 = 256 \lambda$

$\lambda = 1.33 \text{ m}$

(b)  $340 = v (0.85)$

$v = 400 \text{ Hz}$

**38.** The fossil fuels like coal and petroleum contain small amounts of nitrogen and sulphur. When fossil fuels are burnt, it produces oxides of nitrogen and sulphur. These gases cause inhalation problems and in presence of rain forms acid rain. Burning of fossil fuels also increases the amount of suspended particles in air that reduce the visibility.

**Or**

**Hint**—The rocks are heated by the sun; they contract during night but not at same rate—resulting in cracks in rocks and ultimately to smaller particles.