

ANSWERS

1. (d) Since, the object is covering equal distances in equal time interval, hence it is moving with a uniform velocity.

$$\text{Also, } A + (N - 1)D = 26$$

$$A = 26 - (N - 1)D$$

$$= 26 - (9 - 1)2$$

$$= 26 - 16$$

$$A = 10$$

During 1st second, the object has already covered 10 m which shows that the object has some initial velocity.

2. (c) Water molecules are showing osmosis. They are moving from outside to inside of the cell where there is high solute concentration.

3. (c) Distance between the molecules of hydrogen gas increases when pressure is reduced or temperature is raised. Further, a high volume provides more space for the motion of the particles and hence, distance increases.

When more hydrogen gas is added to the same container, less space is available for the motion and hence, distance decreases.

4. (c) The organism shown in the figure is *Hydra* which belongs to phylum-Coelenterata and hence, also called as coelenterate. They are mostly marine but *Hydra* is a freshwater coelenterate. Their body encloses a single central cavity called coelenteron or gastrovascular cavity that help in digestion and circulation.

They are radially symmetrical (animal can be bisected in more or less any plane that passes through the centre) and diploblastic (body wall made of two layers) animals.

5. (c) Arthritis, malaria, scurvy, haemophilia, rickets, kala-azar, cancer, mumps, dengue, tetanus are the diseases hidden in the crossword.

6. (c) Since, there is no fractionating column in the apparatus, so only those mixtures are separable, constituents of which have a difference of more than 25°C in their boiling points.

7. (a) Work done = Area under the curve
 $= \frac{1}{2} \times 10 \times 20 = 100\text{ J}$

8. (b) Diffusion is the process of movement of particle from the region of their higher concentration to lower concentration while osmosis is the movement of solvent particles from their higher concentration to lower concentration through semipermeable membrane.

Thus, IV, VII, VIII and IX are diffusion and I, II and VI are osmosis.

Evaporation is the process of conversion of a liquid into its vapour state at any temperature below its boiling point. Thus, III and V are the examples of evaporation.

9. (b) Car A and car C are covering equal distances at equal interval of time. Hence they have uniform velocity and zero acceleration. In case of car B, distance travelled is not equal at each time interval, hence it is in non-uniform accelerated motion.

10. (d) $\text{Speed} = \frac{\text{DISTANCE}}{\text{TIME}} = \frac{240}{4} = 60\text{ MS}^{-1}$

Since, car is moving with a uniform speed.

$$\text{Hence, speed} = \frac{240\text{ M}}{4} = 60$$

$$T = \frac{240}{60}$$

$$T = 4\text{ s}$$

11. (d)

12. (b)

13. (c) Number of molecules of

$$\text{H}_2 = \frac{1}{2} \times N_A = \frac{N_A}{2} = 3.011 \times 10^{23}$$

Since, car is moving with uniform speed.

$$\begin{aligned} \text{Number of molecules of He} &= \frac{2}{4} N_A = \frac{N_A}{2} \\ &= \frac{6.022 \times 10^{23}}{2} \\ &= 3.011 \times 10^{23} \end{aligned}$$

$$\text{Number of molecules of N}_2 = \frac{3}{28} N_A$$

$$\begin{aligned} &= \frac{3N_A}{28} \\ &= \frac{3 \times 6.022 \times 10^{23}}{28} \\ &= 6.45 \times 10^{23} \end{aligned}$$

$$\begin{aligned} \text{Number of molecules of CH}_4 &= \frac{4}{16} \times N_A = \frac{N_A}{4} \\ &= 1.50 \times 10^{23} \end{aligned}$$

14. (a) Cells are of incredible range. They vary in shapes, functions and sizes. There are two main distinct types of cells, i.e. prokaryotic and eukaryotic. Prokaryotic cells are the smallest cells, typically of few micrometers. Living organisms can be either single celled or multicelled on the basis of number of cells.

The new cells arise from pre-existing cells. The cells that are produced by cell division are exactly similar to their parent cell.

In plants, cell wall is composed of cellulose and hemicellulose and pectin. In some lignin is also present in it. It provides protection and support to the plant and also gives its actual shape.

15. (d) Pressure is a scalar quantity. It depends on the magnitude of force applied and area of contact.

16. (b)

Formula of sulphide	Mass of S in 10 g sample
NiS	$\frac{32}{90} \times 10 = 3.5\text{ g}$
FeS ₂	$\frac{2 \times 32}{120} \times 10 = 5.3\text{ g}$
MoS ₂	$\frac{2 \times 32}{160} \times 10 = 4\text{ g}$
PbS	$\frac{32}{239} \times 10 = 1.3\text{ g}$

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17. (b) Here, speed, $S = 344 \text{ m/s}$
 Time, $T = 10 \text{ s}$
 Distance, $D = ?$
 $D = ST$
 $= 344 \times 10$
 $= 3440 \text{ m}$
 $= 3.44 \text{ km}$

18. (b) Pellagra is a disease that occurs when a person does not get enough niacin (Vit-B₃) or tryptophan. Scurvy is a condition caused by prolonged deficiency of vitamin-C (ascorbic acid).

Haemorrhagic disease is a bleeding disorder in infants, which occurs due to the lack of vitamin-K.

Kwashiorkor is a disease that occurs in small children due to the lack of protein in diet.

Xerophthalmia is a condition in which eye fails to produce tears due to deficiency of vitamin-A.

19. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

As mass is neither created nor destroyed due to indestructibility of atoms, which is the smallest unit taking part in a chemical reaction.

20. (a) Loudness of a sound depends on the amplitude while pitch of a sound depends on the frequency of the sound wave.

21. (a) Number of protons = 7
 Number of neutrons = 8
 Number of electrons = $2 + 8 = 10$
 Charge = $7 - 10 = -3$

Thus, symbol of the particle is N^{3-} .

22. (b) Electronic configuration of X (8) = 2, 6
 Electronic configuration of Y (17) = 2, 8, 7
 Both required electrons to complete their octet, so both are non-metals.

23. (c) The figure shows a type of fungi called *Agaricus*. Fungi are group of organisms with a definite cell wall, lack chlorophyll and build up of a single cell or many cells. The reserve food material is in the form of glycogen.

24. (d) Mass is the amount of matter contained in an object which never changes. Weight is the force of attraction of a body towards the centre so, weight on moon is less as compared to weight on earth.

25. (c) The temperature of steam first decreases up to 100° C and at 100° C, it becomes constant due to change in phase from gaseous to liquid. After that, if further decreases upto 0° C and here, again it becomes constant due to phase change (latent heat of fusion). After that, the temperature further decreases to 10° C. Thus, graph (c) shows the correct temperature change with time.

26. (a) During free fall, the apparent weight of the body will be zero, hence upthrust will also be zero.

27. (d)

Species	Number of protons
O_2	$8 + 8 = 16$
N_2	$7 + 7 = 14$
Cl_2	$17 + 17 = 34$
Br_2	$35 + 35 = 70$
CO_2	$6 + 8 \times 2 = 22$
SO_2	$16 + 8 \times 2 = 32$
CH_4	$6 + 4 = 10$
NH_3	$7 + 1 \times 3 = 10$

Thus, only CH_4 and NH_3 have the same number of protons.

28. (b) Here, $U = 20 \text{ m/s}$
 $V = 0$
 $S = 50 \text{ m}$

According to Newton's equation of motion,

$$V^2 - U^2 = 2AS$$

$$-400 = 2A \times 50$$

$$A = \frac{-400}{2 \times 50}$$

$$A = -4 \text{ ms}^{-2}$$

29. (a) Emulsions are infact colloids in which both the constituents, i.e. liquids mix together and do not form layers after settling (due to Brownian motion).
30. (a) All the cells of the body obtain energy from the food we eat. In the cytoplasm of a cell, the biochemical miniature factories called mitochondria oxidises the food and release energy.