



Q.1. What are the limitations of J.J. Thomson's model of the atom?

Ans. According to J.J. Thomson's model of an atom, the electrons are embedded all over in the positively charged spheres. But experiments done by other scientists showed that protons are present only in the centre of the atom and electrons are distributed around it.

Q.2. What are the limitations of Rutherford's model of the atom?

Ans. According to Rutherford's model of an atom the electrons are revolving in a circular orbit around the nucleus. Any such particle that revolves would undergo acceleration and radiate energy. The revolving electron would lose its energy and finally fall into the nucleus, the atom would be highly unstable.

Q. 3. Explain with examples:

a. (i) Atomic number (ii) Mass number, (iii) Isotopes and (iv) Isobars.

b. Give any two uses of isotopes.

Ans. (i) Atomic number: The atomic number of an element is equal to the number of protons in the nucleus of its atom. e.g., Oxygen has 6 protons hence atomic no. = 6.

(ii) Mass number: The mass number of an atom is equal to the sum of the number of protons and neutrons in its nucleus. Protons + Neutrons = Mass number

Example: A Carbon atom has 6 protons and 6 neutrons in its nucleus, thus mass number of carbon is $6 + 6 = 12$

Q.4. The smell of hot sizzling food reaches you several meters away, but to get the smell from cold food you have to go close.

Ans: The smell of hot sizzling food reaches several meters away, as the particles of hot food have more kinetic energy and hence the rate of diffusion is more than the particles of cold food.

Q.5. A diver is able to cut through water in a swimming pool. Which property of matter does this observation show?

Ans: A diver is able to cut through water in a swimming pool. This shows that the particles of water have intermolecular space and has less force of attraction.

Q.6. Give reasons

(a) A gas fills completely the vessel in which it is kept.

(b) A gas exerts pressure on the walls of the container.

(c) A wooden table should be called a solid.

(d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert.



SARVANSIR- CHEMISTRY FOR ALL

Ans: (a) The molecules of gas have high kinetic energy due to which they keep moving in all directions and hence fill the vessel completely in which they are kept.

(b) A gas exerts pressure on the walls of the container because the molecules of the gas are in constant random motion due to high kinetic energy. These molecules constantly vibrate, move and hit the walls of the container thereby exerting pressure on it.

(c) The molecules/particles of wooden table are tightly packed with each other, there is no intermolecular space, it cannot be compressed, it cannot flow, all these characteristics are of solid. So wooden table should be called a solid. '

(d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert. It is because the molecules of air has less force of attraction between them and a very small external force can separate them and pass through it. But in case of solids, the molecules have maximum force of attraction, the particles are tightly bound due to this force. Hence large amount of external force is required to pass through solid.

Q.7. Hydrogen and oxygen combine in the ratio of 1 : 8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas?

Answer: Ratio of H : O by mass in water is:

Hydrogen : Oxygen \rightarrow H₂O

$$\therefore 1 : 8 = 3 : x$$

$$x = 8 \times 3$$

$$x = 24 \text{ g}$$

\therefore 24 g of oxygen gas would be required to react completely with 3 g of hydrogen gas.

Q.8. Which postulate of Dalton's atomic theory is the result of the law of conservation of mass?

Ans. The relative number and kinds of atoms are constant in a given compound. Atoms cannot be created nor destroyed in a chemical reaction.

Q.9. Which postulate of Dalton's atomic theory can explain the law of definite proportions?

Ans: The relative number and kinds of atoms are constant in a given compound.

Q.10. Define the atomic mass unit (u).

Ans: One atomic mass unit is equal to exactly one-twelfth (1/12th) the mass of one atom of carbon-12. The relative atomic masses of all elements have been found with respect to an atom of carbon-12.

Q.11. List the points of differences between homogeneous and heterogeneous mixtures.

Homogeneous mixtures	Heterogeneous mixtures
<ul style="list-style-type: none">• It has uniform composition.• No visible boundaries of separation.• They consist of only one phase. Example: sugar + water \rightarrow sugar solution.	<p>It does not have a uniform composition.</p> <p>Shows visible boundaries of separation.</p> <p>They consist of more than one phase.</p> Example: sugar + sand

Q.12. How are sol, solution and suspension different from each other?



SARVANSIR- CHEMISTRY FOR ALL

Sol. (colloid)	Solution	Suspension
1. Size of solute particles between 1 nm to 100 nm. 2. It is stable. 3. It scatters a beam of light. 4. Solute particles pass through filter paper.	Size of solute particles less than 1 nm (10^{-9} m) Stable. It does not scatter light. Solute particles pass through filter paper.	Size of solute particles is more than 100 nm. Unstable. It scatters a beam of light. Solute particles do not pass through filter paper.

Q.13. Name the functional group present in each of the following compounds:

Classify the following as chemical or physical changes:

cutting of trees,

melting of butter in a pan,

rusting of almirah,

boiling of water to form steam,

passing of electric current, through water and the water breaking down into hydrogen and oxygen gas,

dissolving common salt in water,

making a fruit salad with raw fruits and

burning of paper and wood.

Ans:

Physical Change

- cutting of trees
- melting of butter in a pan
- boiling of water to form steam
- dissolving common salt in water
- making a fruit salad with raw fruits

Chemical Change

- rusting of almirah
- passing of electric current through water and then breaking down into hydrogen and oxygen gas
- burning of paper and wood

Q.14. Which of the following are chemical changes?

(a) Growth of a plant (b) Rusting of iron

(c) Mixing of iron filings and sand (d) Cooking of food

(e) Digestion of food (f) Freezing of water

(g) Burning of a candle.

Ans: Chemical changes are:

(a) Growth of a plant (b) Rusting of iron

(c) Cooking of food (d) Digestion of food

(e) Burning of a candle



Some Questions for practice

1. Calculate the Number of electrons in Ca^{2+} ion?
2. what is atomicity? Calculate the atomicity of Na_2SO_4 ?
3. composition of the nuclei of two atomic species x and y are given as under

Elements	proton	Neutron
X	6	6
Y	6	8

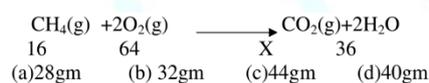
Give the mass number of x and y. what is the relation between two species?

4. Write down the chemical formula of

- (1) Calcium phosphate
- (2) Aluminium sulphate
- (3) sodium carbonate

5. Study the chemical reaction given and identify the value of

X (mass of CO_2 in gram)



6. (a) Define matter and write its three states.
(b) Explain how these states of matter arise due to variation in the characteristics of the particles.
7. Define the following terms: (a) Latent heat of fusion. (b) Melting point. (c) Fusion.
8. (a) Define atomic mass unit.
(b) Distinguish between molecular mass and molar mass.
(c) Give an example of (i) diatomic, and (ii) triatomic molecule of compounds.
9. Which of the two would be chemically more reactive; element 'X' of atomic number 18 or element 'Z' of atomic number 16 and why?

Composition of the nuclei of two atomic species A and B are given as under:

Elements	A	B
Protons	17	17
Neutrons	18	20



(a) What are the mass numbers of A and B?

(b) How are they related to each other?

10. (i) Arrange the following substances in increasing order of force of attraction between the particles: (a) water (b) hydrogen (c) sand

(ii) Why does the temperature remain constant at the melting point?

