ATOMS AND MOLECULES

QUESTION BANK

1	Which subatomic particle is absent in an ordinary hydrogen atom? Answer: Neutron.
2	J. Chadwick discovered a subatomic particle which has no charge and has mass nearly equal to that of a proton. Name the particle and give its location in the atom. Answer: The particle is neutron and it is present in the nucleus of the atom.
3	Electron attributes negative charge, protons attribute positive charge. An atom has both but why there is no charge? Answer: The positive and negative charges of protons and electrons are equal in magnitude. So, atom as a whole is electrically neutral.
4	Write the electronic configuration of an element whose atomic number is 12. Answer: K, L, M 2, 8, 2
5	What do you understand by ground state of an atom? Answer: The state of an atom where all the electrons in the atom are in their lowest energy levels is called the ground state.
6	What is the maximum number of electrons which can be accommodated in 'N' shell? Answer: N shell can accommodate maximum 32 electrons.
7	What will be the valency of an atom if it contains 3 protons and 4 neutrons? Answer: The valency of the atom will be one.
8	Give two important applications of radioactive isotopes. Answer: An isotope of carbon-12, C14, is used in carbon dating. U235 is used in the nuclear reactors to generate electricity.
9	Chemical formula of a metal sulphate is MSO4. What will be the formula of its chloride? Answer: MCl2
10	How do you know that nucleus is very small as compared to the size of atom? Answer: Rutherford observed that when a-particles were bombarded on a very thin foil they bounced back. But the number of a-particles bouncing back got doubled when he doubled the thickness of gold foil. Then he concluded that the area of nucleus is very small in comparison to the total area of the atom.
11	Write two characteristics of the canal rays.

	Answer: The canal rays are deflected by the magnetic fields in a direction opposite to that of the cathode rays. They consist of positively charged particles.
12	Write the electronic configuration of a positively charged sodium ion (Na+). Atomic number of sodium is 11. Answer: Number of electrons in Na atom = Atomic number = 11 Number of electrons in Na+ ion = 11 – 1 = 10 Electronic configuration of Na+ ion: 2, 8
13	The atomic number of Al and Cl are 13 and 17, respectively. What will be the number of electrons in Al3+ and Cl–? Answer: Atomic number of Al = Number of electrons = 13 Number of electrons in Al3+ = 13 – 3 = 10 Atomic number of chlorine = Number of electrons = 17 Number of electrons in Cl– = 17 + 1 = 18
14	Write down the electron distribution of chlorine atom. How many electrons are there in the L shell? (Atomic number of chlorine is 17). Answer: The electronic distribution of Cl is 2, 8, 7. The L shell has eight electrons.
15	Define valence electrons. Which electrons of an atom are involved in the chemical bond formation with other atoms? Answer: The electrons present in the outermost shell of an atom or ion are known as valence electrons. In a chemical bond formation, only valence electrons of an atom take part.
16	Why do helium, neon and argon have a zero valency? Answer: Helium has two electrons in its energy shell, while argon and neon have 8 electrons in their valence shells. As these have maximum number of electrons in their valence shells, they do not have any tendency to combine with other elements. Hence, they have a valency equal to zero.
17	Helium atom has 2 electrons in its valence shell but its valency is not 2. Explain. Answer: Helium atom has 2 electrons in its valence shell and its duplet is complete. Hence, the valency is zero.
18	Why do isotopes show similar chemical properties? Answer: Isotopes have same atomic numbers and thus same number of electrons. Therefore, they have the same electronic configuration which provides them similar chemical properties.
19	Name the three sub-atomic particles of an atom. Ans: Three subatomic particles of an atom are Proton, Neutron and Electron.

20	Isotopes of an element have a. The same physical properties b. Different chemical properties c. Different number of neutrons d. Different atomic numbers Ans: (a) The same physical properties.
21	Number of valence electrons in Cl^- ion are: a. 16 b. 8 c. 17 d. 18 Ans: (b) 8
22	Which one of the following is a correct electronic configuration of sodium? a. 2,8 b. 8,2,1 c. 2,1,8 d. 2,8,1 Ans: (b) 2,8
23	Atomic Number of an element is equal to: a. Number of Protons b. Number of electrons c. Number of neutrons d. Both (a) and (b) Ans: (a) Number of Protons
24	How many electrons does Na+[illegible]+ has in its outermost shell? a. 10 b. 11 c. 18 d. 8 Ans: (d) 8
25	Atomic number of an element during a Chemical reaction. a. Increases b. Remain Constant c. Decreases d. May be (a) or (c) Ans: (b) Remain constant
26	Atomicity of fluorine is: a. 1 b. 2 c. 3 d. 4 Ans: (b) 2
27	Electronic configuration of calcium is a. 2,8,8,2 b. 2,8,6,4

	c. 2,8,7,1 d. 2,8,1,7 Ans: (a) 2,8,8,2
28	Nitrogen is: a. Monatomic b. Diatomic c. Triatomic d. Tetratomic Ans: (b) Diatomic