

Basic Concepts Of Chemistry Questions with Solutions

Q1. What are electrons?

Answer: Electrons are negatively charged subatomic particles that have a mass of 9.1×10^{-31} kg. They exist either in a bound state or free state. They are mainly responsible for chemical reactions and the movement of electrons is extensively studied in organic chemistry reaction mechanisms.

Q2. What is a nucleus?

Answer: Nucleus is the core of an atom. It consists of protons and neutrons. It is a tiny, dense region and is positively charged.

Q3. What is the mass number of the element?

Answer: The total number of protons and neutrons in the nucleus of an atom signifies the mass number of an element. For example, the oxygen element has 8 protons and 8 neutrons in its nucleus. Thus, its mass number is 16 amu.

Q4. What is meant by atomic number?

Answer: The atomic number of an element is the number of protons in the nucleus of a neutral atom. In the neutral atom the number of protons is always equal to the number of electrons. For example, the atomic number of a neutral carbon atom is 6, thus it has 6 protons and 6 electrons.

Q5. What is meant by the term valence electrons?

Answer: In simple terms, the electrons which are available for losing and sharing with other atoms are called valence electrons. These electrons are present in the valence shell of an element. For example, the atomic number of neutral carbon atom is 6. The electron configuration of a carbon atom is $1s^2 2s^2 2p^2$. Thus carbon has 4 valence electrons present in the valence shell ($n = 2$).

Q6. What is meant by electron configuration?

Answer: Electron configuration refers to the arrangement of electrons in atomic orbitals of an element. It tells us about the number of electrons present in each atomic orbital of the element.

Q7. What is the electronic configuration of nitrogen?

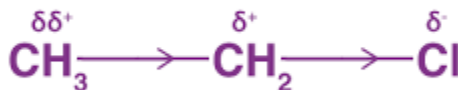
- (a) $1s^2 2s^2 2p^2$
- (b) $1s^2 2s^2 2p^3$

- (c) $1s^2 2s^2 2p^4$
(d) $1s^2 2s^2 2p^5$

Answer: (b)

Q8. What is the inductive effect in organic chemistry?

Answer: The inductive effect is a type of effect where a dipole is generated within the molecule due to the unequal sharing of the bonding electrons. The presence of electron donating groups or electron withdrawing groups give rise to the inductive effect. For example, the electron withdrawing power of the chlorine molecule gives rise to partial positive charge on carbon and partial negative charge on chlorine in chloromethane molecule. Inductive effect is distance dependent. The inductive effect decreases with increase in distance.



Q9. What are isotopes?

Answer: Isotopes are defined as the atoms of the same element with same atomic number but different mass number i.e. they have same number of protons but different number of neutrons. For example, ^{12}C and ^{13}C . Carbon-12 and Carbon-13 have 6 neutrons and 7 neutrons respectively.

Q10. Which is meant by equilibrium?

Answer: Equilibrium is a state in which the concentrations of both the reactants and the products do not change with change in time.

Q11. What are ^{40}Cl and ^{40}Ar ?

- (a) Isotopes
(b) Isobars
(c) Isotones
(d) Isodiaphers

Answer: (b)

Isobars: The elements which have the same mass number but different atomic number are called isobars.

Q12. What is meant by the rate of a reaction?

Answer: The rate of a reaction signifies the speed of a chemical reaction. The rate of the reaction is determined by the rate constant (k). Larger the value of the rate constant, the greater is the rate of the reaction.

Q13. What is meant by endothermic reaction?

Answer: Endothermic reaction is a reaction in which heat is absorbed during the reaction.

Q14. What is meant by exothermic reaction?

Answer: Exothermic reaction is a reaction in which heat is released during the reaction.

Q15. Which are the important functional groups in organic chemistry?

Answer: Carboxylic acids, Esters, Carbonyl compounds, Alcohols are important functional groups in organic chemistry.

Practice Questions on Basic Concepts of Organic Chemistry

Q1. Match the following items in column 1 with items in column 2.

Column 1	Column 2
1) Carboxylic acid	a) R-COOR
2) Ester	b) R-O-R
3) Amide	c) R-CO-NR
4) Ether	d) R-COOH

Answer:

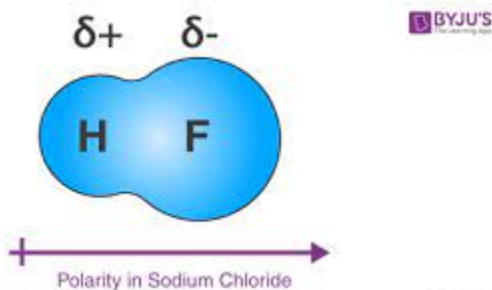
Column 1	Column 2
1) Carboxylic acid	d) R-COOH
2) Ester	a) R-COOR
3) Amide	c) R-CO-NR

4) Ether

b) R-O-R

Q2. What are polar molecules?

Answer: Polar molecules are molecules which have a permanent dipole moment due to the presence of partial positive and negative charges. For example, HF.



Q3. Is acetone a polar molecule?

Answer: Yes, acetone is a polar molecule due to the presence of the polar CO group.

Q4. What is the ideal gas equation?

Answer: $PV = nRT$ is the ideal gas equation.

Q5. What is the value of planck's constant?

Answer: The value of planck's constant is $h = 6.626 \times 10^{-34}$ Js.