

SECTION – I**2. Write short answers to any EIGHT (8) questions :****16**

- (i) Define isotopes. Why they have same chemical properties?
- (ii) What is mass spectrum?
- (iii) Molecular formula is nth multiple of empirical formula. Explain with an example.
- (iv) How can rate of filtration be increased by fluted filter paper?
- (v) Define ether extraction.
- (vi) Calculate the value of general gas constant (R) in SI units.
- (vii) Why do we get straight line, when pressure is plotted against inverse of volume?
- (viii) Why lighter gases diffuse more rapidly than heavier gases?
- (ix) State Joule-Thomson effect.
- (x) How will you prepare 10% w/v glucose solution in water?
- (xi) One molal solution of urea is dilute as compared to one molar solution. Justify.
- (xii) Define molarity. How is molarity related to mass of solute?

3. Write short answers to any EIGHT (8) questions :**16**

- (i) Boiling point of water is greater than boiling point of HF, although hydrogen bonding is stronger in HF than in H_2O . Why?
- (ii) Evaporation is a cooling process. Justify.
- (iii) Define isomorphism and polymorphism giving one example in each.
- (iv) Write two applications of liquid crystals.
- (v) Write nuclear reaction for the production of neutron.
- (vi) Write any two points of Planck's quantum theory.
- (vii) State Hund's rule, giving an example.
- (viii) Write any two defects of Bohr's atomic model.
- (ix) Differentiate between reversible and irreversible reactions.
- (x) How are acidic buffer and basic buffer prepared? Give one example in each case.
- (xi) Define catalysis. Give its different types with one example in each case.
- (xii) Justify that rate of chemical reaction is an ever changing parameter under the given conditions.

4. Write short answers to any SIX (6) questions :**12**

- (i) Explain geometry of H_2S molecule on the basis of VSEPR theory.
- (ii) Define ionization potentials of elements. How the ionization potential vary across the periods?
- (iii) Cationic radius is smaller than that of its parent atomic radius. Why?
- (iv) Differentiate between bonding and antibonding molecular orbitals with reference to relative energies and symmetry of electronic clouds (no figure required).
- (v) Define state function. Write name of two such functions.

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4. (vi) Burning of natural gas is spontaneous reaction. Justify.
 (vii) What are secondary cells? Write name of any two such cells.
 (viii) Describe function of salt bridge in a voltaic cell.
 (ix) Define electrode potential.

SECTION – II

Note : Attempt any **THREE** questions.

5. (a) Write detailed note on : (i) Avogadro's number (ii) Molar volume. 4
 (b) Define vapour pressure. Write down manometric method for its determination with diagram. 4
6. (a) A sample of nitrogen gas is enclosed in a vessel of volume 380 cm^3 at 120°C and pressure of 101325 Nm^{-2} . This gas is transferred to 10 dm^3 flask and cooled to 27°C , calculate the pressure in Nm^{-2} exerted by the gas at 27°C . 4
 (b) Write any four properties of cathode rays. 4
7. (a) Explain the structure of ethyne (C_2H_2) according to hybridization concept. 4
 (b) Explain the following terms : (i) Standard heat of neutralization. 4
 (ii) Standard enthalpy of solution. 4
8. (a) $\text{Ca}(\text{OH})_2$ is a sparingly soluble compound. Its solubility product is 6.5×10^{-6} . Calculate the solubility of $\text{Ca}(\text{OH})_2$. 4
 (b) Explain the effect of temperature on the rate of reaction. 4
9. (a) Differentiate between ideal and non-ideal solutions. 4
 (b) Define electrochemical series. Discuss calculation of the voltage of cell, giving one example. 4