

## Chemistry (Subjective)

(GROUP-I)

Time: 2:40 hours

## SECTION-I

RWP-1-24

(8x2=16)

2. Write short answers of any eight parts from the following:
- Define gram ion. Give two examples.
  - One mole of  $H_2SO_4$  should completely react with two moles of  $NaOH$ . How does Avogadro's number help to explain it?
  - Give any four methods for the separation of isotopes.
  - What is sintered glass crucible? Give its significance.
  - What is crystallization? Give its basic principle.
  - What is chromatogram? Give an example.
  - Derive Avogadro's law from kinetic molecular theory of gases.
  - Give two characteristics of plasma.
  - What is the effect of pressure and temperature on the density of an ideal gas?
  - Why is  $HCl$  added before passing  $H_2S$  gas for the detection of second group basic radicals during salt analysis?
  - What is the effect of rise in temperature on the solubility of  $KI$  in water?
  - What are buffer solutions? Give their two applications.

(8x2=16)

3. Write short answers of any eight parts from the following:
- Why  $HF$  is weaker acid than other hydrogen halides?
  - Define dipole-dipole forces of attraction with example.
  - Why lower alcohols are soluble in water?
  - Define crystal lattice and unit cell.
  - Why it is necessary to decrease pressure in discharge tube to get cathode rays?
  - Define stark effect.
  - What is origin of line spectrum?
  - Why aqueous solution of  $NH_4Cl$  is acidic in nature?
  - Discuss Pauli exclusion principle.
  - Radioactive decay is always first order reaction. Justify.
  - Define solubility with two examples.
  - Rate of reaction decreases with passage of time. Explain.

(6x2=12)

4. Write short answers of any six parts from the following:
- Potassium can displace hydrogen from acids but copper cannot. Explain by giving reason.
  - Calculate the oxidation number of underlined elements :  $HPO_3$ ,  $CrO_3$
  - Differentiate between system and surrounding by giving example.
  - Define enthalpy of combustion by giving suitable example.
  - What do you mean by internal energy? Briefly explain.
  - The bond angle of  $H_2O$  is not  $109.5^\circ$  like that of  $CH_4$ . Although 'O' and 'C' are both  $sp^3$  hybridized. Explain with reason.
  - $\pi$ -bonds are more diffused than  $\sigma$ -bonds. Explain with reason.
  - The heat of vapourization of electrovalent compounds are higher than covalent compounds. Explain with reason.
  - Write down basic assumption of VSEPR-theory.

## SECTION-II

(8x3=24)

- Note Attempt any three questions. Each question carries equal marks:
- (a) Define following terms: (i) Atom (ii) Isotope (iii) Empirical formula (iv) Molecular formula. (4)
  - (b) Give four (04) applications of liquid crystals. (4)
  - (a) Calculate the density of  $CH_4$  gas at  $0^\circ C$  and 1 atm. What will happen to the density if temperature is increased to  $27^\circ C$  (2+2)
  - (b) Explain azimuthal quantum number in detail. (4)
  - (a) Define ionization energy. How does it vary in the periodic table? What factors are responsible for their variations? (4)
  - (b) The solubility product of  $Ag_2CrO_4$  is  $2.6 \times 10^{-2}$  at  $25^\circ C$ . Calculate the solubility of the compound. (4)
  - (a) Explain how enthalpy of a reaction can be measured by Bomb Calorimeter? Draw diagram also. (3+1)
  - (b) How electrode potential of Zn can be measured? Draw diagram also. (3+1)
  - (a) Define elevation of boiling point and describe Landsberger's method for measurement of boiling point elevation. (4)
  - (b) Define catalysis. Explain its types with suitable examples. (1+3)