Chemistry (Hons.) Paper-I

Answer five questions, selecting at least one from each Group.Q.1. is compulsory.

1. Explain any three of the following :
   (a) Hydrogen bond
   (b) Kinetic energy of one mole of an ideal gas is 3/2 RT
   (c) Metals are conductor of heat and electricity.
   (d) De-Broglie waves of macroscopic objects are insignificant
   (e) SF_6 molecule is Octahedral in Shape

Group-A

2. (a) Explain two major defects in postulates of kinetic theory of gases.
   (b) Establish van der Waals' equation of gaseous state.
3. (a) Discuss different types of solids with examples in brief.
   (b) Explain Miller indices.
   (c) Sketch the crystal structure of NaCl and find out number of Na^+ and Cl^- ions in its unit cell.
4. Write notes on any three of the following :
   (a) Gold number
   (b) Tyndall effect
   (c) Electrophoresis
   (d) Hardy-Schulze law
5. (a) Find out an expression for RMS Velocity. Calculate RMS velocity of H_2 gas at 300 K ($R = 8.32\ JK^{-1}\ mol^{-1}$)
   (b) Derive an explain Bragg's equation.

Group-B

6. (a) Give a brief account of de-Broglie equation.
   (b) Calculate de-Broglie wavelength of electron movign witha velocity of $10^7\ ms^{-1}$.
7. (a) Write down Schrodinger wave equation.
   (b) Give an account of Mulliken's experiment for determination of charge of an electron.
8. (a) Ascertain the position of elements in P.T. having atomic number 11, 17, 24, 29 and 47.
   (b) Explain the variation of I.P. of elements in Groups and Periods in P.T.
   (c) Explain s,p and d block elements giving examples.
9. Explain any three of the following :
   (a) Ethanol is miscible but bengene is immiscible with water.
   (b) He_2^+ exists but He_2 does not exist.
   (c) dz^2 has conical nodal plane.
   (d) Water has maximum density at 4°C.
   (e) Bond angle of NH_3 is less than that of CH_4 molecule.
10. Write notes on any three of the following :
    (a) Oxy acids of chlorine
    (b) Barax bead test
    (c) Air pollution
    (d) White lead and red lead