

[This question paper contains 4 printed pages.]

1245

Your Roll No.

B.Sc. (Hons.)/I

A

CHEMISTRY – Paper I

(Inorganic Chemistry)

Time : 3 Hours

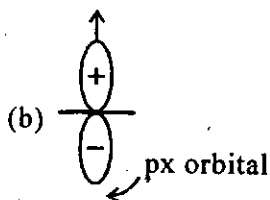
Maximum Marks : 38

(Write your Roll No. on the top immediately
on receipt of this question paper.)

Attempt six questions in all.

Question No. 1 is compulsory.

1. (a) How the solubility of alkaline earth metal sulphates varies in water ?



What these plus and minus signs signify ?

- (c) HF is a liquid whereas HCl is a gas, explain.
- (d) In the compound R_3PF_2 , F, occupies axial position in trigonal bipyramidal structure; explain.

(2×4)

P.T.O.

2. (a) Write Schrödinger wave equation for hydrogen atom. Explain the physical significance of ψ^2 .
- (b) Discuss Normal and orthogonal wave functions and their importance.
- (c) Draw radial probability distribution curves for 3s & 3d orbitals. (2,2,2)

3. (a) Find out electron gain enthalpy using following data :

$$\text{Enthalpy of Formation} = 381 \text{ kJ mol}^{-1}$$

$$\text{Lattice energy} = 757 \text{ kJ mol}^{-1}$$

$$\text{Ionization Enthalpy} = 496 \text{ kJ mol}^{-1}$$

$$\text{Dissociation energy (Cl}_2\text{)} = 121 \text{ kJ mol}^{-1}$$

$$\text{Sublimation energy} = 108 \text{ kJ mol}^{-1}$$

(for Na metal)

- (b) What is Pauling's Scale of electronegativity. Why Pauling's Scale is commonly used by chemists.

- (c) Explain :

Electron affinity of fluorine is less than that of chlorine. (3,2,1)

4. (a) Using band theory, explain the conductivity of metals and semiconductors. (3)
- (b) Draw molecular orbital diagrams for O_2 and NO molecules (3)

5. (a) Explain Hydrogen Bonding. Is it really a bonding ?
Explain in terms of Bond energy involved in
Hydrogen bonding. (1½)

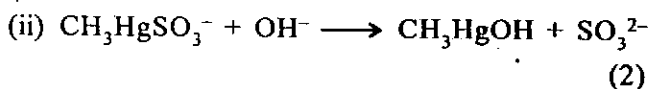
(b) Using VSEPR theory, predict the shapes of
following molecules.



(c) The electronegativities of hydrogen and fluorine
atoms are 2.1 and 4.0. Calculate percentage ionic
character in HF. (1½)

6. (a) Using HSAB principle, explain the following
reactions

(i) between R_2S and $\text{C}_2\text{H}_5\text{Cl}$



(b) Write conjugate bases for the following :



(c) What is Lewis acid-base concept. (2)

7. (a) What is electroneutrality principle ? (2)

(b) Write short notes on :

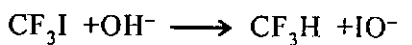
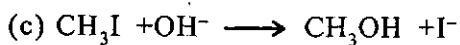
(i) Fajan' Rule

(ii) Radius ratio Rule (2×2)

P.T.O.

8. (a) Why s-orbital is spherical in shape? (2)

(b) Explain levelling effect. (2)



Explain the products formation in above reactions.

(2)