

CHEMISTRY PAPER-I

(Inorganic Chemistry-A)

Time Allowed : Three Hours

Maximum Marks : 22

Note : (1) Attempt five questions in all, selecting two questions each from of Unit I and Unit II.

(2) Unit (V) is compulsory.

Unit-I

1. (a) Write relation between Cartesian co-ordinates and spherical polar co-ordinates with diagram. 2
- (b) Write quantum numbers for the orbital $2P_z$. 1
- (c) How many Nodal planes are there in S orbital ? 1
2. (a) Write notes on Radial Wave Function and Angular Wave Function. 2
- (b) Draw Radial Probability Distribution curve for 3d orbital. 1
- (c) Give expression for de-Broglie Equation and Heisenberg Uncertainty Principle. 1

Unit-II

3. (a) Calculate Effective Nuclear charge of 3P electron in phosphorous elements. 2
- (b) Which have more Ionization Energy : N or O and why ? 1
- (c) Which have smaller size : Ne or F? 1
4. (a) Which is more electronegative : C_2H_2 or CH_4 ? 1
- (b) How many elements are there in p-block ? 1

(c) What is difference between Electron Affinity and Electronegativity?
Calculate electronegativity of chlorine from following data :

$$E_{\text{Cl-Cl}} = 58.25 \text{ K.Cal/mole}$$

$$E_{\text{H-H}} = 104.2 \text{ K.Cal/mole}$$

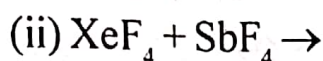
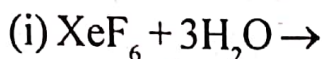
$$E_{\text{H-Cl}} = 103.28 \text{ K.Cal/mole.}$$

2

Unit-III

5. (a) Discuss structure and bonding of XeO_3 molecule. 2

(b) Complete the reactions :



1

(c) Why do most of compounds involve Xenon, Fluorine and Oxygen ? 1

6. (a) Why Lithium is strongest reducing agent among alkali metals ? 2

(b) Write brief note on CRYPTATES. 1

(c) Alkali metals when dissolved in Ammonia give blue colour solution, why ?

Unit-IV

7. (a) Draw molecular orbital diagram of HF molecule. 2

(b) Why is some covalent compound, ionic character is there ? 1

(c) Why bond angle in H_2O is more as compared to H_2S ? 1

8. (a) Discuss bonding and shape of ClF_3 molecule on basis of VSEPR theory. 2

(b) Calculate percentage of ionic character in XY molecule if dipole moment of XY molecule is 2.3 D and bond distance is 1.5 Å. 2

Unit-V (Compulsory)

IX. (a) Arrange in order of increasing basic character



1

(b) How many Lone pair and Bond pair of \bar{e} are there in H_2O ? 1

(c) Which is more hydrated and why $-\text{Li}^+$ and Cs^+ ? 1

(d) Define Eigen Values and Eigen Function. 1

(e) Give biological functions of Ca^{2+} and Mg^{2+} ions. 1

(f) What is difference between atomic orbital and molecular orbital? 1