[This question paper contains 3 printed pages.]

901 *Your Roll No.* .....

B.Sc. (Hons.) / I **C**

CHEMISTRY – Paper I

(Inorganic Chemistry – I)

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 **1** *carries* **8** *marks.*

1. Explain :

   (a) Electron affinity of Nitrogen is low.

   (b) Ice floats on water.

   (c) Which of two, N_2 or NO, has higher Ionization energy ?

   (d) Hybridization in central atom of XeF_4. (2×4=8)

2. (a) Calculate using slater rules the effective nuclear charge for 3d & 4s electrons in Cobalt ($Z = 27$).

P.T.O.

(b) Calculate the bond length of H-F molecule from the following data

r_H = 0.37A°, r_F = 0.72 A°

χ_H = 2.1 , χ_F = 4.0 (3,3)

3. (a) Calculate the radius ratio for an ionic crystal when the coordination number of cation is 3.

(b) Explain why lithium halides do not obey radius rules. (4,2)

4. (a) Draw the radial probability distribution plot for 2s & 2p orbitals.

(b) Write the Kapustinskii equation for the lattice energy & explain the various terms. (4,2)

5. (a) Write the resonating structures for N_3^-.

(b) Explain the order of bond angle in OCl_2 and H_2O. (3,3)

6. (a) Using VSEPR theory, give the geometry & shapes of the following ICl_2^-, $SnCl_2$.

(b) Which of the following is more covalent and why ?

CuCl or KCl (4.2)

7. (a) Which way the following reaction will proceed. Justify on the basis of HSAB principle.

$2LiI + CoF_2 = CoI_2 + 2LiF$

(b) Which one is a stronger base and why ?

NH_3 or PH_3.

(c) Explain the strength of HCl, HNO_3 in water.

(2,2,2)

8. (a) Define electronegativity in terms of Pauling & Mulliken's scale.

(b) Explain Acidic Basic character of

Cs-O-H, Cl-O-H, Al-O-H. (3,3)