(F) Why are lanthanides called as inner transition elements ? Discuss oxidation state of lanthanides. 2½

5. Attempt any **TEN** of the following :

(i) What are nonbonding orbitals ?

(ii) Draw M.O. diagram of H_2 molecule.

(iii) Give any one method of preparation of ClF_3 compounds.

(iv) Why is Zn^{2+} colourless ?

(v) Why are el-block elements called transition elements ?

(vi) Complete the reaction :

$H_2O + H_2O \longrightarrow$

(vii) What is maximum oxidation state shown by Co, Rh and Ir ?

(viii) Define precision.

(ix) What is relative error ?

(x) Define actinide contraction.

(xi) Define Gadolinium break.

(xii) Name any one pair of chemical twins. 10×1=10

NTK/KW/15/5827

Bachelor of Science (B.Sc.) Semester-III Examination

CHEMISTRY CH–301 (Inorganic Chemistry)

Paper–I

Time—Three Hours] [Maximum Marks—50

N.B. :– (1) All **FIVE** questions are compulsory and carry equal marks.

(2) Write equations and draw diagrams wherever necessary.

1. (A) Draw and explain Coulson's M.O. diagram of CO molecule and calculate its bond order. 5

(B) What are interhalogen compounds ? How are they classified ? Discuss the structure of IF_5. 5

OR

(C) Differentiate between bonding and antibonding molecular orbitals. 2½

(D) Draw M.O. diagram of HF molecule and calculate its bond order. 2½

(E) Explain the structure of S_4N_4. 2½

(F) Define Polyhalides. Discuss the structure of I_3^-. 2½

2. (A) Discuss first transition series with respect to :

(i) Electronic configuration

(ii) Oxidation state. 5

(B) (i) Discuss acid base reaction in liquid ammonia and liquid sulphur dioxide solvent.

(ii) Explain catalytic activity of 3d-block elements. 5

OR

(C) Discuss colour property of first transition series elements. 2½

(D) Discuss 3d block elements with respect to complex formation tendency. 2½

(E) Give classification of solvents on basis of proton-donor acceptor property. 2½

(F) Explain why Cu^{2+} is paramagnetic and Cu^{+} is diamagnetic in nature. 2½

3. (A) (i) Discuss 5d series elements with respect to electronic configuration.

(ii) Explain the steps involved in 2.5 d rule for rejection of data. 5

(B) Define error. Discuss the classification of error with one example each. 5

OR

(C) Compare and discuss oxidation states of Cr, Mo and W. 2½

(D) Define the terms Mean and Median with example. 2½

(E) In estimation of chromium in a sample of steel, the results of six measurements of % of chromium are 15.68, 15.56, 15.42, 15.51, 15.53, and 15.52. by applying Q-test find whether 15.68 can be retained or rejected. (Q value for 6 observations is 0.56). 2½

(F) Determine the number of significant figures in following results :

(i) 5.008 (ii) 5.82×10^{-4} (iii) 0.0058 (iv) 33.4500

(v) 535. 2½

4. (A) What is lanthanide contraction ? Explain its cause and discuss its any two consequences. 5

(B) (i) Discuss actinides with respect to oxidation state.

(ii) Write electronic configuration of lanthanides. 5

OR

(C) Explain complex formation tendency of lanthanides. 2½

(D) Discuss solvent extraction method for separation of lanthanides. 2½

(E) Discuss position of actinides in periodic table. 2½