[Total No. of (i) Printed Pages 4 (ii) Questions 9]

Sub Code : 0350 (1048) **Exam Code :** 0004

Exam : B.A./B.Sc. (General) 4th Semester

Subject : Chemistry (Same for B.Sc. Microbial & Food Technology)

Paper : Paper-XIII Inorganic Chemistry-B

Time : 3 Hours ***Maximum Marks : 22***

Note: Attempt **five** questions in all. Selecting at least **one** question from **each** unit. Question No. **1** is **compulsory**.

1. (a) What is the Oxidation state of uranium in UO_2^{2+} and UO_2^{+}. 1

(b) Which Lanthanide is radioactive. 1

(c) Which of the following behave both as bronsted acid as well as base:- H_2O, HCO^-_3, H_2SO_4, H_3PO_4. 1

(d) Give Autoconisation of SO_2. 1

(e) In the reaction : $SnCl_2 + 2HgCl_2 \rightarrow Sncl_4 + Hg_2Cl_2$ label the oxidising and the reducing agent. 1

(f) Why solvents with high dipole moments dissolve polar substances easily. 1

P.T.O.

UNIT - I

2. (a) What is Lanthanide contraction ? What is its cause ? 2

   (b) Lanthanides have poor tendency to form complexes. Explain. 2

3. (a) Compare the following properties of Lanthanides with Actinides : 3

   (i) Oxidation states

   (ii) Complex formation

   (iii) Tendency to form oxoions

   (b) Draw the structure of $UO_2(No_3)_2.(H_2O)_2$ 1

UNIT - II

4. (a) Explain why (i) Cl-OH is an acid whereas NaOH is a base (ii) HNo_3 is a stronger Acid than HNo_2. 3

   (b) Identify base and acid in the following Reaction using Lux-Flood concept: $CaO+S_1O_2 \rightarrow CaS_1O_3$. 1

5. (a) Explain why : 3

   (i) Trisilylamine is a weaker base than Trimethylamine

   (ii) BBr_3 is a stronger Acid than BCl_3.

   (b) Justify by Lewis concept that CO_2 is an acid. 1

UNIT - III

6. (a) The Latimer diagram is $ClO^- \underline{+0.42}\ Cl_2 \underline{+1.36}\ Cl^-$ calculate the value for the reduction of ClO^- to Cl^- in aquous basic medum. 2

(b) Explain the terms disproportionation and comproportionation using frost diagram. 2

7. (a) What is a Pourbaix Diagram ? What informations are conveyed by this diagram ? 2

(b) Will Cu^+ undago disproportionation in an aquous medium ? Standard Reduction Potentials are 0.158V for Cu^{2+} to Cu^+ and 0.522V for Cu^+ to Cu. 2

UNIT - IV

8. (a) Solutions of sodium in liquid ammonia are blue and good reducing agents. Explain. 1

(b) Complete the following reactions :

(i) $SbCl_5 + NOCl \xrightarrow{liqSO_2}$ 1

(ii) $PbI_2 + KNH_2 \xrightarrow{liq\ NH_3}$ 1

(c) What are Ionising and Non-ionising solvents. Give **one** example of each. 1

(d) Give solvolytic reaction of Ammonuim acetate in liquid SO_2.

9. (a) Write Autoionisation of liquid NH_3 and discuss with example Acid – Base Reactions in liquid NH_3. 2

(b) In what respect liquid NH_3 is a better solvent than water. 2