(i) Printed Pages: 4] Roll No. .....

(ii) Questions : 9] Sub. Code : 0 3 5 0

Exam. Code : 0 0 0 4

B.A./B.Sc. (General) 4th Semester Examination

1047

CHEMISTRY

(Inorganic Chemistry-B)

(Same for B.Sc. Microbial and Food Technology)

Paper - XIII

Time : 3 Hours] **[Max. Marks : 22**

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

1. (a) What happens when cerium (III) nitrate is treated with alkaline $KMnO_4$?

   (b) What are transuranic elements ?

   (c) Why H_2Se is stronger acid than H_2S ?

(d) What is the electrode potential for O_2/H_2O half reaction ?

$$O_2 \xrightarrow{-0.33} O_2^- \xrightarrow{1.69} H_2O_2 \xrightarrow{1.77} H_2O$$

(e) Out of $Zn(NH_3)_2$, NH_4Cl, KNH_2 which of the following shows amphoteric behavior in liquid ammonia ?

(f) Which is stronger acid : BF_3 *or* BCl_3 ? 1×6

Unit–I

2. (a) Describe the extraction of lanthanides from Monazite.

(b) What is Lanthanide Contraction and give its consequences ? 2,2

3. (a) What are nuclear fuels ? Give preparation of plutonium.

(b) Why actinides have greater tendency to form complexes compared to lanthanides ? 2,2

Unit–II

4. Explain the trend of basic strength of primary, secondary and tertiary amines (in gaseous as well as aqueous media). 4

5. Explain the trend of acidic strength of the following molecules :

   (a) $H_3PO_4 < H_2SO_4 < HClO_4$

   (b) $BF_3 < BCl_3 < BBr_3$ 2,2

Unit–III

6. (a) Calculate E° for the reaction :

   $Fe^{3+} + 3e^- \rightarrow Fe$

   Given :

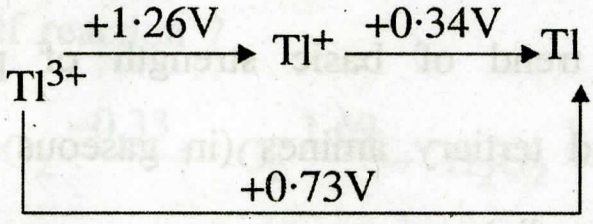
   (i) $Fe^{3+} + 3e^- \rightarrow Fe$ $\quad \Delta G° = +0.17F$

   (ii) $Fe^{3+} + e^- \rightarrow Fe^{2+}$ $\quad E° = +0.77V$

   (iii) $Fe^{2+} + 2e^- \rightarrow Fe$ $\quad E° = -0.47V$

   (b) Why lithium is the strong reducing agent ? Explain with a well labelled redox cycle. 2,2

7. (a) Consider the Latimer diagram for thalium :



Construct a frost diagram and explain :

(i) Stability of Tl^{+}

(ii) Which one is a strong oxidant.

(b) Give an example of Pourbaix diagram. 3,1

Unit–IV

8. (a) Describe the following on role of a solvent in chemical reaction :

(i) Dielectic constant

(ii) Heat of fusion and heat of vapourisation

(b) Why NH_4Cl is an acid in liquid NH_3 and K_2SO_4 is a base in liquid SO_2. 2,2

9. (a) Discuss the important advantages of liquid sulphur dioxide as solvent in spite of its toxic nature.

(b) Explain ammonolysis with at least *two* examples. 2,2