(i) Printed Pages: 3 Roll No. .....

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

Exam. Code : 0 0 0 4

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

1059

CHEMISTRY

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

Paper-XIII (Inorganic Chemistry-B)

Time Allowed : Three 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) Which element of actinide series has the highest melting and boiling point ?

   (b) Write the formula of conjugate base of : HSO_4^-, $CH_3NH_3^+$.

   (c) In the reaction, $SnCl_2 + 2\ HgCl_2 \rightarrow SnCl_4 + Hg_2Cl_2$ label the oxidising and reducing agent.

   (d) Account for the solubility of AgI in liquid NH_3.

   (e) Show Lewis Acid Base reaction between CaO and SO_3.

   (f) How is electrode potential of a couple related to Gibbs free energy change ? 1×6=6

UNIT—I

2. (a) Which out of $Ca(OH)_3$ and $Lu(OH)_3$ is more basic and why ?

   (b) Why is Eu(II) more stable than Ce(II) ?

   (c) Name the most important ore of uranium. 1½,1½,1

3. (a) What are actinides ? Why are they so called ? Give their general electronic configuration.

   (b) What are Nuclear fuels ? Give preparation of plutonium.

   (c) What is the coordination number of Cerium in $[Ce(NO_3)_6]^{2-}$? 1½,1½,1

UNIT—II

4. Explain the trend of basic strength of 1°, 2° and 3° Amines in gaseous as well as aqueous medium. 4

5. (a) What are levelling and differentiating solvents ? Discuss one example in each case.

   (b) Explain solvent system concept of Acids and Bases taking an example of NH_3 as a solvent. 2,2

UNIT—III

6. (a) Construct a Frost diagram from the Latimer Diagram given below :

   $O_2 \underline{\quad +0.70 \quad} H_2O_2 \underline{\quad 1.76 \quad} H_2O$. According to the diagram which species is thermodynamically least stable and hence will undergo disproportionation ?

   (b) What do you understand by the term Redox stability in water ? 2,2

7. (a) What is a Pourbaix diagram ? What information is conveyed by it ?

(b) What is the electrode potential for O_2/H_2O half reaction :

$$O_2 \underline{\quad -0.33 \quad} O_2^- \underline{\quad 1.69 \quad} H_2O_2 \underline{\quad 1.77 \quad} H_2O \ ?$$

2,2

UNIT—IV

8. (a) Discuss Acid Base neutralisation in liquid NH_3.

(b) What are amphoteric solvents ? Give examples.

(c) Explain why liquid SO_2 is a better solvent for organic compounds. 2,1,1

9. (a) Complete the following reactions :

(i) $2KI + SOCl_2 \xrightarrow{Liq\,SO_2}$

(ii) $N_6Cl_5 \xrightarrow{Liq\,SO_2}$

(b) Discuss the autoionisation of liquid SO_2 as non-aqueous solvent. What are the most effective acids and bases of this solvent system ? Give reactions.

(c) Explain why metal-liquid NH_3 solutions are good reducing agents. 1,2,1