

(i) Printed Pages: 3

Roll No.

(ii) Questions : 9

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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, $\text{SnCl}_2 + 2 \text{HgCl}_2 \rightarrow \text{SnCl}_4 + \text{Hg}_2\text{Cl}_2$
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 $\text{Ca}(\text{OH})_2$ and $\text{Lu}(\text{OH})_3$ is more basic and why ?
(b) Why is $\text{Eu}(\text{II})$ more stable than $\text{Ce}(\text{II})$?
(c) Name the most important ore of uranium. $1\frac{1}{2}, 1\frac{1}{2}, 1$
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 $[\text{Ce}(\text{NO}_3)_6]^{2-}$? $1\frac{1}{2}, 1\frac{1}{2}, 1$

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

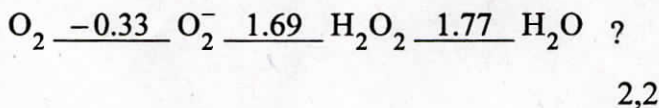
UNIT—III

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

$\text{O}_2 \xrightarrow{+0.70} \text{H}_2\text{O}_2 \xrightarrow{-1.76} \text{H}_2\text{O}$. According to the diagram which species is thermodynamically least stable and hence will undergo disproportionation ?

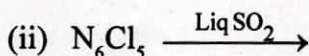
- (b) What do you understand by the term Redox stability in water ? 2,2

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 :



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 :



- (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