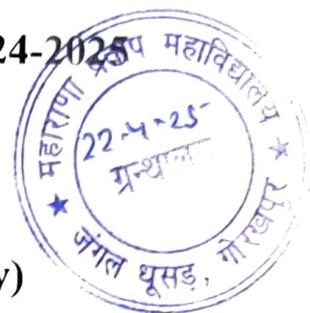## CHE 508N/CHE 508

M.Sc. IInd SEMESTER EXAMINATION, 2024-2025

(CBCS MODE)

CHEMISTRY

(Thermodynamics and Electrochemistry)

Time : Three Hours]   [Maximum Marks : 75

5163

Note: There are **three** sections (**A, B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1.   Answer all questions : $5 \times 3 = 15$

   (a)   Explain concentration polarization and limiting current density.

   (b)   Discuss decomposition potential. How it is measured experimentally ?

   (c)   What is Gibbs-Helmholtz equation ? Discuss its application.

   (d)   Discuss the difference between Entropy and residual entropy.

   (e)   Discuss Debye Falkanhagen effect.

Section-B

Note : Answer all questions of the following : 4×5=20

2.   (a)   Discuss Nernst heat theorem with proof and mention some of its application.

<div align="center">OR</div>

     (b)   What is Joule Thomson's effect and show that joule Thomson coefficient is zero for an ideal gas ?

3.   (a)   Discuss the effect of ionic strength on the rate of ionic reactions.

<div align="center">OR</div>

     (b)   Write short note on Wein's effect.

4.   (a)   What is mean by electrical double layer (EDL) ? Illustrate stern's theory of EDL.

<div align="center">OR</div>

     (b)   What is mean by dissolution potential and deposition potential ?

5.   (a)   What is mean by activity and fugacity ? Discuss the variation of fugacity with temperature and pressure.

<div align="center">OR</div>

     (b)   Discuss Maxwell's relation and their application in thermodynamics.

Section-C

6. What is basic difference between Electro-osmosis and Electrophoresis ?

   Give the quantitative treatment of Electro Osmosis.

7. What is meant by the phenomenon of overvoltage ? Discuss H_2 and O_2 overvoltage with their applications.

8. Discuss the concept of chemical potential in thermodynamics and explain its variation with temperature and pressure.

9. Discuss the application of third law of thermodynamics in the determination of absolute Entropy.

●●●●