No. of Printed Pages : **2**

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M.Sc. I Semester Degree Examination, April/May - 2024

CHEMISTRY

Kinetics and Electrochemistry
(NEP)

Time : 3 Hours Maximum Marks : 70

Note : *Answer **any five** of the following questions with question No. **1 Compulsory**. Each question carries **equal** marks.*

1. (a) Deduce Gibb's-Duhem equation for relation between chemical potential in thermodynamics. **5+5+4=14**

(b) Explain Maxwells relations related to thermodynamics.

(c) Discuss Rault's law for osmotic pressure.

2. (a) Describe Lindeman theory of Unimolecular reactions with mechanism.

(b) Explain H_2-Halogen photochemical reactions. **4+5+5=14**

(c) What are branched chain reactions ? Discuss its general rate expression.

3. (a) Discuss, variation of activation energies in enzyme catalysis. **4+5+5=14**

(b) State and derive BET equation for multilayer adsorption.

(c) Derive, Michaelis-Menton equation for enzyme catalysis.

4. (a) Discuss Ostwald's dilution law with suitable example. **4+5+5=14**

(b) Explain, Debye-Huckel limiting law.

(c) Discuss, Faraday's laws of electrolysis.

5. (a) Discuss the different types of corrosion with examples. **5+5+4=14**

(b) Explain, metal coatings in corrosion control.

(c) Write a note on Hydrogen embrittlement with its application in corrosion control.

P.T.O.

6. (a) Explain parallel and consecutive reactions with examples. **5+5+4=14**

(b) Write a note on steady state approximation with general example.

(c) Give brief account on :

(i) Solvent effect

(ii) Adsorption isotherm

7. (a) Explain Bjerrum theory of ion association. **5+5+4=14**

(b) Discuss the mechanism of electrochemical theory of corrosion for iron metal.

(c) Write notes on :

(i) Ionic atmosphere

(ii) Alloying and de alloying

8. (a) Discuss RRKM theory for unimolecular reaction rates with mechanism. **5+5+4=14**

(b) Derive Harkin-Jura equation for surface area in adsorption.

(c) Write notes on :

(i) Huckel equation

(ii) Corrosion in boiler

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