

S.NO: 22N1-PCH

Course Code: PGQK

A.D.M.COLLEGE FOR WOMEN, NAGAPATTINAM

(AUTONOMOUS)

M. Sc. (Chemistry) Degree Examination

III Semester – November – 2022

CC VII – PHYSICAL CHEMISTRY II

Time: 3 hours

Maximum Marks: 75

Section –A

10X2=20

Answer **ALL** the Questions:

1. Write about Slater determinant for helium atom.
2. Justify the need of approximation methods.
3. What are the characteristic features of various models of electrical double layer?
4. What is a calomel electrode? Write down its reaction during oxidation and reduction reactions.
5. What is meant by over voltage? Write a hydrogen over voltage.
6. What is cathodic protection? Give example.
7. What are the limitations of B.E.T equation?
8. Define Turnover Number
9. Define the term fugacity.
10. State III law of Thermodynamics.

Section -B

5X5=25

Answer **ALL** the Questions:

11. a) Discuss the application of Perturbation method to helium atom.

(or)

b) Explain the terms L – S and j – j coupling.

12. a) Explain Falkenhagen effect and Wien's effect.

(or)

b) Write a short note on separation of proteins using the Tiselius method.

13. a) What are fuel cells? Explain its construction and function.

(or)

b) Derive Butler Volmer equation for the electrode process.

14. a) Analyse the Langmuir – Rideal mechanism for surface reactions.

(or)

b) What are the limitations and success of Langmuir Adsorption Isotherm?

15. a) What is chemical potential? Derive Gibbs-Duhem equations.

(or)

b) Explain how fugacity of a real gas determined.

Section -C

3 X 10 = 30

Answer any **THREE** Questions:

16. (i) Discuss the Hartree – Hartre – Fock Self Consistence Field Method for many electron system.
(ii) Find the IR and Raman active symmetry modes of H₂O.
17. (i) Derive Debye Huckel Limiting Law.
(ii) What is the significance of Lippmann equation?
18. Sketch and explain Pourbaix diagram and Evans diagram.
19. (i) Explain the mechanism and kinetics of enzyme catalysed reaction.
(Michaelis-Menton Equation)
(ii) Discuss the kinetics surface catalyzed reactions by Rideal - Eley mechanisms.
20. (i) Describe a method of determination of activity and activity co-efficient of a non-electrolyte.
(ii) State Nernst heat theorem and explain its applications.