Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., CHEMISTRY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
V	PART - III	CORE	U21CH510	PHYSICAL CHEISTRY - III

Date & Session: 02.05.2025/AN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	The Clausius-Clapeyron equation is used to determine. a) ΔG b) ΔH c) ΔS d) ΔE
CO1	K2	2.	Residual entropy is observed when. a) A substance has a perfectly ordered structure at 0 K b) A substance has multiple equivalent microstates at 0 K c) A system undergoes an isothermal expansion d) The chemical potential remains constant
CO2	K1	3.	The unit of the rate constant for a first-order reaction is. a) mol L^{-1} s^{-1} b) s^{-1} c) L mol^{-1} s^{-1} d) L^2 mol^{-2} s^{-1}
CO2	K2	4.	For a zero-order reaction, the rate of reaction. a) Increases with an increase in reactant concentration b) Decreases as the reaction proceeds c) Remains constant throughout the reaction d) proportional to the square of the reactant concentration
CO3	K1	5.	The Langmuir adsorption isotherm involves. a) Unimolecular adsorption b) Multilayer adsorption c) Bimolecular adsorption d) None of these
CO3	K2	6.	In the Michaelis-Menten equation for enzyme kinetics, the term Km represent a) Maximum reaction velocity b) Substrate concentration at half-maximal velocity c) Rate of enzyme inhibition d) Total enzyme concentration
CO4	K1	7.	According to the Lewis concept, a acid is a. a) Proton donor b) Proton Acceptor c) Electron pair donor d) Electron pair Acceptor
CO4	K2	8.	The common ion effect is observed when. a) A solution contains two salts with a common ion b) The solubility of a salt increases in solution c) A strong acid is added to a weak acid solution d) The dissociation of a weak base increases
CO5	K1	9.	The liquid junction potential (LJP) arises due to. a) The movement of ions at different speeds across an interface b) The reduction of a metal electrode c) The oxidation of a metal electrode d) The use of a standard hydrogen electrode

CO5	K2	10.	An example for a reference electrode is. a) Copper electrode b) Zinc electrode c) Standard Hydrogen Electrode d) Silver electrode
Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Derive Clausius clapeyron equation and discuss its applications. **(OR)**
CO1	K3	11b.	How would you apply the Nernst heat theorem to explain the relation between entropy and temperature.
CO2	K3	12a.	Sketch and explain the factors influencing the rate of reaction. **(OR)**
CO2	K3	12b.	Explain how rate constant for first order reaction is determined using suitable example.
CO3	K4	13a.	Distinguish between physisorption and chemisorption. **(OR)**
CO3	K4	13b.	Illustrate how BET equation is used to investigate multilayer adsorption.
CO4	K4	14a.	Classify buffer solution. Give its pH value. **(OR)**
CO4	K4	14b.	Deduce Oswald dilution law dissociation of acids and bases. Give its limitations.
CO5	K5	15a.	Explain the Nernst equation for emf of cell. **(OR)**
CO5	K5	15b.	Discuss the significance of electrochemical series.

Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Examine the applications of Gibbs-Duhem equation. **(OR)**
CO1	K3	16b.	Illustrate the partial molar properties with example.
CO2	K4	17a.	Comment on absolute reaction rate theory. **(OR)**
CO2	K4	17b.	Discuss the features and limitations of collision theory for reaction rate.
CO3	K4	18a.	Analyse the characteristics of catalytic reaction. **(OR)**
CO3	K4	18b.	Deduce Michaelis-Menton equation for enzyme catalysis.
CO4	K5	19a.	Formulate the hydrolysis of weak acids and strong base. **(OR)**
CO4	K5	19b.	Interpret the applications of solubility product.
CO5	K5	20a.	Discuss the principle of potentiometric titration with an example. **(OR)**
CO5	K5	20b.	Explain in detail the pH value is determined using quinhydrone electrode.