PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch - CHEMISTRY

PHYSICAL CHEMISTRY-I

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions

ALL questions carry EQUAL marks   (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The conductance of a solution decreases with a) Increasing dilution b) Increasing concentration c) Increasing ionic mobility d) Increasing temperature	K1	CO1
	2	The unit of transport number is a) dimensionless b) S cm² mol⁻¹ c) Ω^{-1} cm⁻¹ d) mol cm² s⁻¹	K2	CO1
2	3	The dissociation constant of a weak electrolyte can be determined using a) Ohm's law b) Ostwald dilution law c) Faraday's law d) Kohlrausch's law	K1	CO1
	4	Debye–Hückel–Onsager equation relates: a) Conductance & dilution b) Λ°_m and Λ_m with concentration c) Transport number and ionic mobility d) Activity and ionic strength	K2	CO1
3	5	According to Lewis theory, base is a a) Proton donor b) Electron pair acceptor c) Electron pair donor d) Neutral species	K1	CO2
	6	The ionic product of water at 25 °C is a) 1×10^{-14} b) 1×10^{-7} c) 1×10^{-12} d) 1×10^{-10}	K2	CO2
4	7	The calomel electrode contains a) Hg only b) Hg + KCl + Hg₂Cl₂ c) Hg + NaCl d) Hg + CuSO₄	K1	CO2
	8	For SHE, the potential is independent of a) Gas pressure b) H⁺ concentration c) Temperature d) Electrode material	K2	CO2
5	9	The process of zinc coating on iron to prevent corrosion is called a) Electroforming b) Galvanization c) Chroming d) Ion plating	K1	CO3
	10	In electroless plating, deposition is achieved by a) Electrolysis b) Chemical reduction c) Ion bombardment d) Mechanical spraying	K2	CO3

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Analyse Ohm's law and its application in electrolytic conductance.	K4	CO1
		(OR)		
	11.b.	Determine transport number by Moving Boundary method.		
2	12.a.	Outline conductometric titrations with neat graph.	K4	CO1
		(OR)		
	12.b.	Enumerate sailent features of Debye–Hückel theory of strong electrolytes.		
3	13.a.	Discuss Brønsted–Lowry concept of acids and bases with examples.	K3	CO2
		(OR)		
	13.b.	Explain the leveling effect with suitable examples.		
4	14.a.	Give an account of Electrochemical series and its applications.	K3	CO2
		(OR)		
	14.b.	Explain potentiometric titrations with neat graph.		
5	15.a.	Discuss the principle of electroplating with a neat diagram.	K5	CO3
		(OR)		
	15.b.	Describe the electrodeposition method and its applications.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks   (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain Kohlrausch's law of independent migration of ions. Give applications.	K5	CO1
2	17	Determine the Arrhenius theory of electrolytic dissociation and its limitations.	K4	CO1
3	18	Derive an expression for dissociation constant (K_a) of a weak acid.	K5	CO2
4	19	Derive the Nernst equation for measuring EMF of a cell.	K5	CO2
5	20	Classify and explain the different types of coatings.	K4	CO3

Z-Z-Z   END