

Reg. No.....

Name.....

**BA, B SC, B COM DEGREE END SEMESTER EXAMINATION - OCTOBER 2025****UGP (HONS.) SEMESTER - 3: DISCIPLINE SPECIFIC COURSE****COURSE: 24UCHEDSC207 – CHEMISTRY FOR PHYSICAL SCIENCES***(For Regular 2024 Admission)*

Time: 1.5 Hours

Max. Marks: 50

**PART A*****(Answer all questions. Each question carries 1 mark)***

1. State Grotthuss-Draper law (R, CO 1)
  2. Define electroosmosis in the context of colloids? (U, CO 1)
  3. State the phase rule? (R, CO 2)
  4. What is meant by electrolysis? (R, CO 3)
  5. Define Molar conductivity. (R, CO 3)
  6. Explain the term EMF of a cell? (U, CO 3)
  7. Give an example for fuel cell. (U, CO 3)
  8. What is meant by a reversible cell? (R, CO 3)
- (1 x 8 = 8)**

**PART B*****(Answer any five questions. Each question carries 3 marks)***

9. What is meant by a primary process in a photochemical reaction? (U, CO 1)
10. Give the Freundlich and Langmuir adsorption equation and explain the terms. (U, CO 1)
11. Sketch the phase diagram of the water System and label it. (U, CO 2)
12. The cell constant of a cell is  $0.5 \text{ cm}^{-1}$ . The resistance of an electrolyte solution taken in the cell is 50 ohms. Calculate the conductivity of the solution. (A, CO 3)
13. How is  $\Lambda_m^0(\text{CH}_3\text{COOH})$  calculated from  $\Lambda_m^0(\text{CH}_3\text{COONa})$ ,  $\Lambda_m^0(\text{HCl})$  and  $\Lambda_m^0(\text{NaCl})$  (A, CO 3)
14. Write down the representation of the cell constructed from  $\text{Al}/\text{Al}^{3+}(\text{aq}, 1 \text{ M})$  and  $\text{Cu}/\text{Cu}^{2+}(\text{aq}, 1 \text{ M})$ . Give the anode, cathode and cell reactions. (A, CO 3)
15. Briefly explain the uses of electrochemical series (U, CO 3)
16. How is the  $\text{p}^{\text{H}}$  of a solution determined by the quinhydrone electrode (U, CO 3)

**(3 x 5 = 15)**

**PART C****(Answer any two questions. Each question carries 6 marks)**

17. Distinguish between the terms photochemical reaction and chemiluminescence with suitable examples (U, CO 1)
18. Explain the optical property *Tyndall effect* and the electrical property *zeta potential* of colloids with suitable examples. (U, CO 1)
19. Explain how the distribution law can be applied to the study of association of solutes in the solution phase. (R, CO 2)
20. Sketch the conductometric titration curves for (a) a strong acid – weak base titration and (b) a weak acid-strong base titration and explain (U, CO 3)
- (6 x 2 = 12)**

**PART D****(Answer any one question. Each question carries 15 marks)**

21. (a) Explain the term transport number. Discuss the Hittorf's method of determining transport number. (b) An aqueous solution of Copper sulphate containing 10.09 g of the anhydrous salt in 200g of solution was electrolyzed between copper electrodes. After electrolysis, 275.4 g of the anode solution was found to contain 15.4 g of copper sulphate and 3.096 g of silver was deposited in a coulometer placed in series. Calculate the transference numbers of cupric and sulphate ions. Equivalent mass of  $\text{CuSO}_4 = 79.77$ , Equivalent mass of Silver = 108. (A, CO 3)
22. a) Explain the principle of potentiometric titrations with suitable examples  
b) Give an example for a concentration cell with transference in which the electrodes are reversible with respect to anion and derive an expression for the liquid junction potential (U, CO 1)
- (15 x 1 = 15)**