

(FOR THE CANDIDATES ADMITTED

23UCY509

DURING THE ACADEMIC YEAR 2023-2024 ONLY)

REG.NO. :

N.G.M. COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS: NOVEMBER 2025

B.Sc. CHEMISTRY

MAXIMUM MARKS: 75

SEMESTER-V

TIME: 3 HOURS

PART-III

ELECTRO CHEMISTRY

SECTION – A

(10×1 =10MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. With dilution, the equivalent conductance of the strong electrolyte _____
(a) Increases indefinitely (b) Decreases
(c) Remains constant (d) Becomes zero
2. In electrochemical series, a more positive E^0 value means the species is _____
(a) Stronger reducing agent (b) Stronger oxidizing agent
(c) Weaker oxidizing agent (d) Weaker oxidant
3. In cyclic voltammetry, the plot obtained is _____
(a) Current vs resistance (b) Voltage vs charge
(c) Current vs potential (d) Concentration vs conductivity
4. The pH of a buffer solution depends on _____
(a) Concentration of acid only (b) Concentration of salt only
(c) Volume of solution (d) Ratio of acid to salt concentrations
5. The electrolyte used in dry cell is _____
(a) NaCl (b) KOH
(c) $\text{NH}_4\text{Cl} + \text{ZnCl}_2$ paste (d) H_2SO_4

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. What is ionic mobility?
7. How is ionic product of water determined by conductance measurement?
8. What is the use of salt bridge?
9. What is buffer action?
10. What is hydrogen overvoltage?

PART –B

(5×5 =25MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. (a) Explain Kohlrausch's law and its applications.
(OR)
(b) Describe Hittorf's method of transport number determination.

12. (a) Derive and explain the Nernst equation.
(OR)
(b) What is electrochemical series? Explain its any two applications.
13. (a) What is liquid junction potential? How can it be eliminated?
(OR)
(b) Derive the EMF of a concentration cell without transference.
14. (a) Derive Henderson's equation for buffer solutions.
(OR)
(b) Write a short note on quinhydrone electrode.
15. (a) Write a note on the construction and working of the lead-acid storage battery.
(OR)
(b) Differentiate between anodic and cathodic coatings.

PART-C (5 × 8 = 40)

(K4OR5)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

16. (a) Explain Arrhenius theory of electrolytic dissociation and Ostwald's dilution law.
(OR)
(b) Discuss Wien effect and Debye – Falkenhagen effect.
17. (a) What is solubility product? Explain its applications.
(OR)
(b) Discuss the various types of reversible electrodes.
18. (a) Derive the expression for determining the mean ionic activity coefficient of an electrolyte using the EMF of a concentration cell without transference.
(OR)
(b) Discuss cyclic voltammetry with neat diagram and applications.
19. (a) Explain the Ostwald's theory of acid – base indicators with examples.
(OR)
(b) Describe the hydrolysis of salts. Derive the relationship between K_h , K_w , K_a and K_b .
20. (a) Discuss in detail the construction, working, advantages and limitations of lead – acid batteries.
(OR)
(b) Discuss methods of prevention of corrosion with suitable examples.
