SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E / B. Tech – CSE/E&C/ECE/EIE/ETCE/IT
Title of the paper: Principles of Electrochemical Sciences & Instrumentation
Semester: II Max. Marks: 80
Sub.Code: 6C0019 Time: 3 Hours
Date: 15-05-2008 Session: FN

PART – A (10 x 2 = 20)

Answer All the Questions

1. Define Resistance and Specific Conductance.
2. Distinguish between Reversible and Irreversible cells.
3. Write down the principle involved in cathodic protection.
4. Impure metal corrodes faster than pure metal under identical conditions. Justify.
5. What is the purpose of MnO_2 in dry cell?
6. Write down the cell reaction equation of Nickel Cadmium battery.
7. Give any two advantages of adhesive bonding.
8. List out the additives for lubricant oil.
9. Write down any two applications of pH meter.
10. What are the significant of gas chromatography?

PART – B (5 x 12 = 60)

Answer All the Questions

11. a. Explain Kohlrausch's Law and its applications.
    b. The specific conductance of a saturated solution of $BaSo_4$ at 25°C is 4.63×10^{-6} Ohm^{-1} cm^{-1}. Given that A_0 (equivalent conductance) values for ½ $BaCl_2$, Na_2So_4 and Nacl are 139.9, 130.1 and 126.5 respectively. Calculate the solubility of $BaSo_4$ at

25°C if k (Conductance) for the water used in this experiment is 1.12×10^{-6}.

(or)

12. a. Starting from the basic principles, derive the Nernst equation.
    b. Determine the single electrode potential of a standard Hydrogen electrode.

13. What is electro chemical corrosion? Explain the factors of electro chemical corrosion by oxygen absorption.

(or)

14. a. What are the objectives of electro plating? Explain Nickel plating.
    b. What is drying oil? Explain the mechanisms of drying of oil.

15. With a neat diagram, explain the construction and charging and discharging of lead acid battery.

(or)

16. What is calorific value of a fuel? Explain the construction and working principle of hydrogen oxygen fuel cell.

17. a. Write down the properties of abrasive materials. (5)
    b. Discuss in detail the physical and chemical factors affecting the adhesive action. (7)

(or)

18. a. What is lubricant? Explain its function and classification. (7)
    b. Distinguish between natural and synthetic abrasive. (5)

19. With a neat diagram, explain the basic principle and applications of conductivity meter.

(or)

20. With a neat diagram, explain the basic principle and applications of Liquid Chromatography.