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B.E. / B. TECH. (FULL TIME) END SEMESTER EXAMINATIONS APRIL / MAY 2014

COMMON TO ELECTRICAL AND ELECTRONICS ENGINEERING AND  
ELECTRONICS AND INSTRUMENTATION ENGINEERING BRANCHES

SEMESTER II

**CY8252 CHEMISTRY FOR ELECTRICAL AND ELECTRONICS ENGINEERING**  
(REGULATIONS 2012)

DURATION: 3 HOURS

MAX.MARKS: 100

ANSWER ALL QUESTIONS

**PART-A (10 x 2 = 20 Marks)**

1. On dilution of an electrolytic solution, while specific conductance decreases, equivalent conductance increases – Explain.
2. Find whether the following cell is thermodynamically feasible:  
 $\text{Cu} / \text{Cu}^{2+} (0.01\text{M}) || \text{Cu}^{2+} (0.1 \text{ M}) / \text{Cu}$  at 298 K.
3. Distinguish between nuclear fission and fusion with an appropriate example.
4. Write down the cell reactions and mention the output voltage for a lead acid storage battery.
5. What are photonic polymers? Give two of their uses.
6. What are photoresist polymers? Mention one of its applications.
7. What are the causes for priming and foaming in boilers? How can they be prevented?
8. List the sludge forming compounds in boilers and write any two adverse effects they cause.
9. What is the principle of AFM?
10. List any two applications of DSC.

**PART-B (5 X 16 = 80 Marks)**

11. Discuss the components, construction and working of the following energy sources:
  - i) Ni-Cd battery, (5)
  - ii)  $\text{H}_2 - \text{O}_2$  fuel cell and (5)
  - iii) Nuclear power reactor. (6)

12.a. i) Given that  $E_{\text{Zn}^{2+}/\text{Zn}}^0 = -0.76 \text{ V}$ ,  $E_{\text{Fe}^{2+}/\text{Fe}}^0 = -0.44 \text{ V}$ ,  $[\text{Fe}^{2+}] = 0.005 \text{ M}$  and  $[\text{Zn}^{2+}] = 0.01 \text{ M}$ , represent the cell made of the above electrodes, write the cell reactions and calculate the emf and  $\Delta G$  at 298 K. (8)

ii) Describe the determination of hydrogen ion concentration of a solution using an ion selective electrode. (8)

(OR)

12.b. i) Explain the origin of electrode potentials and define standard electrode potential of a metal. (6)

ii) What is electromotive force? Discuss Poggendorf compensation method for the determination of emf of an electrochemical cell, using Weston Cadmium cell. (10)

13.a. i) Explain the formation of scales in boilers and discuss the internal conditioning methods for prevention of scales. (10)

ii) Explain the desalination of brackish water by reverse osmosis. (6)

(OR)

b. i) Discuss the principle and working of an external conditioning method for boiler feed water treatment. (8)

ii) Explain the causes, effects and prevention of A) boiler corrosion and B) caustic embrittlement. (8)

14.a. i) Explain the electrical conductivity of p and n type semiconductors on the basis of their band structures. (8)

ii) Write an informative note on electrically conducting polymers. (8)

(OR)

b. i) Describe the preparation, properties and other uses of: A) a resin used in electric insulation and B) a resin used in surface coating. (10)

ii) Write short notes on insulators and superconductors. (6)

15.a. i) Discuss the principle, instrumentation and application of flame photometry for the estimation of sodium in a saline water sample. (8)

ii) Write a note on the principle and applications of SEM and TEM. (8)

(OR)

b. i) Explain the principle and instrumentation of Atomic Absorption Spectroscopy. (8)

ii) Explain the principle and instrumentation of thermal analysis by TGA and discuss its application to study the thermal stability of calcium oxalate. (8)