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B.E. /B. TECH. (FULL TIME) END SEMESTER EXAMINATIONS MAY / JUNE 2013

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. Define specific and equivalent conductance of an electrolyte.
2. For the cell, $\text{Ag} / \text{Ag}^+ \parallel \text{Ag}^+ / \text{Ag}$ at 298K, calculate the emf, given that the concentrations of the electrolyte at cathode and anode are 0.5 M and 0.05 M respectively.
3. What is a breeder reactor? Write down the breeding reaction of Pu-239 from U-238.
4. Write down the electrochemical reactions during charging and discharging of a Ni-Cd battery and mention its output voltage.
5. What are polyelectrolytes? Give an example.
6. Classify insulating materials based on their physical state with one example for each class.
7. What is the principle of reverse osmosis for desalination of water?
8. How is caustic embrittlement caused in boilers?
9. What is the principle of differential scanning calorimetry?
10. List any four advantages of AFM over SEM.

PART-B (5 X 16 = 80 Marks)

11. i) Name the scale forming compounds in boilers. Explain the phosphate, colloidal, calgon and carbonate conditioning methods for the prevention of scales in boilers. (8)
- ii) Discuss the causes, effects and control of boiler corrosion. (4)
- iii) Explain the principle of ion exchange demineralization for water treatment with appropriate exchange reactions. (4)

- 12.a. i) Describe the measurement of single electrode potential of metallic electrodes using SHE. (8)
ii) Define emf of a cell and explain its measurement by potentiometric method. (8)

(OR)

- 12.b. i) Describe the construction and working of a pH electrode and explain the measurement of pH of a solution using the same. (8)
ii) What is emf series? Discuss its applications with suitable examples. (8)

- 13.a. i) With a neat sketch, describe the components of a nuclear reactor. (6)
ii) Discuss the construction and working of a lead acid storage battery. (6)
iii) Write a short note on solar photovoltaic cells for generation of electrical current. (4)

(OR)

- b. i) What are fuel cells? Explain the construction and working of $H_2 - O_2$ fuel cell. (6)
ii) Describe the working of a lithium ion battery and mention its advantages over Ni-Cd batteries. (6)
iii) Differentiate nuclear fission from nuclear fusion. (4)

- 14.a. i) Explain the electrical properties of conductors, insulators and semiconductors on the basis of band theory. (10)
ii) Distinguish between thermoplastics and thermosets. (6)

(OR)

- b. i) Describe the preparation, properties and uses of phenolic resins. (8)
ii) What are photoresists? Explain their application in photolithography. (8)

- 15.a. i) Discuss the principle of flame emission photometry and explain its application in the quantitative estimation of sodium in an aqueous solution of NaCl. (10)
ii) With a neat schematic diagram, explain the principle and instrumentation of thermogravimetric analysis. (6)

(OR)

- b. i) Explain the principle and instrumentation of Atomic Absorption Spectroscopy. Mention its applications. (10)
ii) Write an informative note on scanning electron microscopic analysis. (6)