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Code No. : 1209

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. I Year II - Semester (Main) Examinations, July - 2015

Engineering Chemistry – II
(For CSE, ECE and IT Branches)

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 X 2=20 Marks)

1. What is a redox electrode? Give an example with notation.
2. Copper gets deposited on iron nail immersed in copper sulphate solution. Give reason.
3. Write the discharging reactions of Nicad battery.
4. What are fuel cells? Give any three applications of fuel cells.
5. Mention the principle of cathodic protection.
6. Differentiate electroplating and electroless plating.
7. Calculate the degrees of freedom for the following equilibrium system.
 $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
8. What do you understand by critical point and triple point?
9. List the applications of liquid crystals.
10. Classify the nano materials and give examples for them.

Part-B (5 X 10=50 Marks)

11. a) What is electrochemical series? Write its applications. [5]
b) Prove that electrode potential of a metal-metal insoluble electrode depends on the concentration of its electrolyte only by taking an example. [3]
c) Calculate the EMF of the following cell at 25°C [2]
 $\text{Zn}(\text{s})/\text{Zn}^{2+}(0.2\text{M}) // \text{Ag}^+(0.002\text{M})/\text{Ag}(\text{s})$. The standard EMF of the cell is 1.54V
12. a) Discuss the Lead-acid battery with its construction, charging and discharging reactions. [7]
What are its applications?
b) Construct Phosphoric acid fuel cell and list its limitations. [3]
13. a) Discuss the mechanism of electrochemical corrosion. [5]
b) Define paint. What are its essential constituents and explain their functions? [5]
14. a) Illustrate Lead-Silver system with a well labeled phase diagram. [5]
b) State Gibbs phase rule and explain the terms, phase and component with an example each. [5]
15. a) Formulate any two synthetic methods for the preparation of membranes. [5]
b) Categorize liquid crystals based on their chemical properties and explain. [5]
16. a) Construct Li-ion battery. Explain the chemical reactions involved in it. [5]
b) What are reversible and irreversible cells? Give examples. [3]
c) What is galvanic corrosion? Give an example. [2]
17. Answer any two of the following
a) Discuss molecular ordering in liquid crystals. [5]
b) Discuss the factors affecting rate of corrosion. [5]
c) Explain water system with its phase diagram. [5]
