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Code No. : 1204

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

Engineering Chemistry – II
(For Civil, Mechanical and EEE 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. Differentiate between galvanic cell and electrolytic cell with an example each.
2. Deduce the relationship between equivalent conductance and molar conductance.
3. What are the merits and demerits of phosphoric acid fuel cell?
4. Write the reactions during the discharging of lead acid battery.
5. Can we store copper sulphate solution in iron vessel (SRP s of Copper and Iron are 0.34 and -0.44 V.). Explain.
6. Deposition of extraneous matter on metal surface for a long period is undesirable. Justify.
7. Define Degree of Freedom and give an example for bivariant system.
8. Calculate the number of components when NH_4Cl is heated in a closed vessel.
9. Define viscosity and viscosity index of a lubricating oil.
10. What are the characteristics of a good refractory?

Part-B (5 X 10=50 Marks)

11. a) Arrange the following metals in the order along with justification in which they displace each other: [4]
Al, Cu, Fe, Mg and Zn. The standard reduction potentials of these metals are -1.66 V, +0.34 V, -0.44 V, -2.37 V and - 0.76 V respectively.
b) How pH of a solution is determined using quinhydrone electrode? What are its advantages and limitations? [6]
12. a) What are rechargeable lithium batteries? Explain how they function and how are they charged? [6]
b) Write the cell representation of Ni-Cd battery. Explain the cell reactions. [4]
13. a) How does the following factors affect the rate of corrosion? [5]
i) Nature of corrosion product
ii) Relative areas of cathode and anode.
b) Explain the mechanism of corrosion of iron when covered partially by a drop of KCl Solution with a neat diagram. [5]
14. a) What do you understand by the term component in phase rule? Explain with two examples. [4]
b) Illustrate and explain the phase diagram of Cu-Ni system. [6]
15. a) Discuss the mechanism of lubrication. [5]
b) How the following properties influence the stability of a refractory? [5]
i) Refractoriness and
ii) Refractoriness under load
16. a) Construct a cell using $\text{Cu} / \text{Cu}^{2+}$ (0.5 M) and Ag / Ag^+ (0.1 M) [5]
i) Write the electrode reactions and overall cell reaction
ii) Calculate the cell potential at 298K. Standard potentials of Copper and Silver electrodes are 0.34V and 0.8V respectively.
b) Differentiate primary, secondary and flow batteries cells. [5]
17. Answer any two of the following:
a) What is the principle and importance of cathodic protection? Explain any one method with a labeled diagram. [5]
b) Sketch two methods of synthesis of membranes with equations. [5]
c) Classification of lubricants with examples. [5]