Code No. : 12005 O2

VASAVI COLLEGE OF ENGINEERING (*Autonomous*), HYDERABAD
B.E. I Year II-Semester Backlog Examinations, May-2017

Engineering Chemistry-II
(Civil, Mech. & EEE)

Time: 3 hours   Max. Marks: 50

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

Part-A (15 Marks)

1. Write the cell reaction of glass electrode. [1]

2. Write the net reaction during use (discharging) of the lead – acid storage cell. [1]

3. How galvanization is different from cathodic protection? [1]

4. What are the number of phases present in saturated solution of NaCl? [1]

5. Comment on the criteria for selection of lubricants for specific purposes. [1]

6. Specific conductance of 0.1 N $CuSO_4$ solution at 298 K is 40.8 S/Cm. Calculate its equivalent and molar conductance at same temperature. [2]

7. Differentiate primary and secondary batteries. [2]

8. Iron corrodes faster under drops of salt solution. Justify. [2]

9. Calculate the number of degrees of freedom in the decomposition of solid calcium carbonate in a closed vessel. [2]

10. The selection of a refractory for a furnace lining has to be chosen based in its chemical nature. Explain with examples. [2]

Part-B (5 × 7 = 35 Marks)

11. a) An iron wire is immersed in a solution containing $ZnSO_4$ and $NiSO_4$. The concentration of each salt is 1M. Predict, giving reasons, which of the following reaction is likely to proceed. (i) Iron reduces Zn^{2+} ions. (ii) Iron reduces Ni^{2+} ions. Given $E^o(Zn^{2+}/Zn) = - 0.76V$; $E^o(Fe^{2+}/Fe) = - 0.44V$; $E^o(Ni^{2+}/Ni) = - 0.25V$. [3]

    b) Derive Nernst equation. How does it explain the dependence of electrode potential on concentration of the electrolyte solution? [4]

12. a) Explain the construction and working of phosphoric acid fuel cell. [3]

    b) Illustrate Zn-C battery with its merits and demerits. [4]

13. a) Discuss mechanism of wet corrosion with a relevant example. [4]

    b) Explain galvanic corrosion. [3]

14. a) Explain the Lead Silver system. How can this system be applied to the process of desilverisation of Argentiferous lead? [4]

    b) Write short notes on [3]
        (i) Triple point   (ii) Condensed Phase rule

15. a) How are refractories classified? Explain a process for measurement of refractoriness. [4]

    b) Discuss the applications of membranes in modern technology. [3]

16. a) Write the Nernst equation and calculate the EMF of the following cell at 298 K.   [3]
    Mg(s)/Mg^{2+} (0.001M) // Cu^{2+}(0.0001M)/ Cu(s). Given that E^0 Cu^{2+}/ Cu = 0.34 V;
    E^0 Mg^{2+}/Mg = -2.37 V.

    b) Explain the construction of Lead acid battery and write the reactions involved when it   [4]
    behaves as galvanic cell.

17. Write short notes on any **two** of the following: [7]

    a) Electro plating and Electro less plating

    b) Phase rule and its terms.

    c) Mechanism of lubrication.

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