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18CHE12

First Semester B.E. Degree Examination, Dec.2018/Jan.2019 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define terms : (i) Free energy (ii) Entropy (iii) Cell potential. (06 Marks)
- b. For the cell, $\text{Fe} | \text{Fe}^{2+}(0.01\text{M}) || \text{Ag}^+(0.1\text{M}) | \text{Ag}$, write the cell reaction and calculate the e.m.f of cell at 298 K, if standard potentials of Fe and Ag electrodes are -0.44 V and $+0.8\text{V}$ respectively. (07 Marks)
- c. What are Secondary Batteries? Explain the construction and working of Nickel – metal hydride (Ni - MH) battery. Mention its applications. (07 Marks)

OR

- 2 a. Define Primary, Secondary and Reserve batteries with examples. (06 Marks)
- b. What are concentration cells? The cell potential of copper concentration cell $\text{Cu} | \text{CuSO}_4(0.005\text{M}) || \text{CuSO}_4(X) | \text{Cu}$ is 0.0295 V at 25°C . Calculate the value of X. (06 Marks)
- c. Explain the construction and working of glass electrode giving its application in determination of pH of solution. (08 Marks)

Module-2

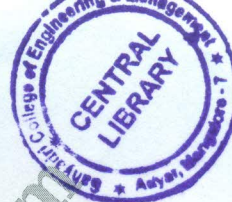
- 3 a. Define corrosion. Describe the electrochemical theory of corrosion taking rusting of iron as an example. (07 Marks)
- b. Explain (i) Water line corrosion (ii) Pitting corrosion. (06 Marks)
- c. What is electroless plating? Explain electroless plating of Nickel. (07 Marks)

OR

- 4 a. What is meant by metal finishing? Mention (any five) technological importance of metal finishing. (06 Marks)
- b. Explain the process of (i) Galvanizing (ii) Anodising of Al. (07 Marks)
- c. What is electroplating? Explain electroplating of chromium. Mention why chromium cannot be used as anode. (07 Marks)

Module-3

- 5 a. Define calorific value of fuel. Explain the experimental determination of calorific value of solid / liquid fuel using Bomb calorimeter. (08 Marks)
- b. What are fuel cells? Describe the construction and working of Solid Oxide Fuel Cell (SOFC). (06 Marks)
- c. What are Solar cells? Explain the construction and working of photovoltaic (PV) cell. (06 Marks)



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