

CBCS Scheme

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15CHE12/22

First/Second Semester B.E. Degree Examination, Dec.2017/Jan.2018 Engineering Chemistry

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. What is an ion selective electrode? Explain the method of determining the pH of a solution using glass electrode. (06 Marks)
b. Discuss the construction and working of Zinc – air battery. (05 Marks)
c. What are fuel cells? How it is different from a galvanic cell? Mention any two advantages of fuel cells. (05 Marks)

OR

- 2 a. Describe the construction and working principle of glass electrode. (06 Marks)
b. Explain the construction and working of Ni – metal hydride batteries. (06 Marks)
c. What are concentration cells? The emf of the cell $\text{Cu} | \text{CuSO}_4 (0.01\text{M}) || \text{CuSO}_4(\text{XM}) | \text{Cu}$ is 0.0295V at 25°C. Find the value of X. (04 Marks)

Module-2

- 3 a. Define corrosion. Explain electrochemical theory of corrosion. (06 Marks)
b. What is Anodization? Explain anodization of aluminium. (06 Marks)
c. Mention the difference between electroplating and electroless plating. (04 Marks)

OR

- 4 a. Write a note on polarization and over potential. (06 Marks)
b. What is galvanization? Describe the galvanization process for iron. (05 Marks)
c. Explain the process of electroplating of hard chromium. (05 Marks)

Module-3

- 5 a. Define calorific value. Explain how calorific value of solid fuel is determined by bomb calorimeter. (07 Marks)
b. Explain the synthesis of petrol by Fischer – Tropsch process. (05 Marks)
c. Write the advantages and disadvantages of PV cells. (04 Marks)

OR

- 6 a. What is knocking in IC engines? Explain its mechanism with chemical reactions. (06 Marks)
b. Explain the modules, panels and arrays of PV cells. (06 Marks)
c. What is reforming of petroleum? Give any three reactions involved in reformation. (04 Marks)

Module-4

- 7 a. What are conducting polymers? Discuss the conduction mechanism in polyaniline and mention any tow applications. (07 Marks)
b. What is glass transition temperature? Explain any 3 factors influencing Tg values. (05 Marks)
c. Explain the synthesis and applications of silicon rubber. (04 Marks)

OR

- 8 a. A polymer has the following composition 100 molecules of molecular mass 1000g/mol, 200 molecules of molecular mass 2000g/mol and 500 molecules of molecular mass 5000g/mol. Calculate the number and weight average molecular weight. (06 Marks)
- b. Explain the synthesis and applications of: i) PMMA and ii) Epoxy resin. (06 Marks)
- c. Distinguish between addition and condensation polymerization with example. (04 Marks)

Module-5

- 9 a. Define COD. Discuss the experimental determination of COD of waste water. (06 Marks)
- b. Define desalination. Explain desalination of sea water by electro dialysis process. (06 Marks)
- c. Write a note on carbon nano tubes. Mention its applications. (04 Marks)

OR

- 10 a. Discuss the boiler corrosion due to O_2 , CO_2 and $MgCl_2$ and its control. (07 Marks)
- b. Explain the synthesis of nano materials by sol-gel process. (05 Marks)
- c. Write a note on priming and foaming. (04 Marks)
