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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 two 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)
