

CBCS SCHEME

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17CHE12/22



First/Second Semester B.E. Degree Examination, July/August 2021

Engineering Chemistry

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Derive Nernst equation for single electrode potential. (08 Marks)
b. Describe the construction and working of calomel electrode. (06 Marks)
c. Explain the following battery characteristics : (06 Marks)
i) capacity ii) cycle life.
- 2 a. Explain the construction and working of nickel – Metal hydride battery. (08 Marks)
b. Discuss the construction of Zinc – air battery. (06 Marks)
c. The EMF of the cell $\text{Hg} | \text{Hg}(\text{NO}_3) (0.01\text{m}) || \text{Hg}(\text{NO}_3)_2(0.10\text{m}) | \text{Hg}$ was found to be 0.0295V at 298K, what is the valency of mercury? (06 Marks)
- 3 a. What is metallic corrosion? Discuss the electro chemical theory of corrosion. (08 Marks)
b. How does the following factors affect the rate of corrosion?
i) Nature of corrosion product
ii) p^{H} . (06 Marks)
c. What is metal finishing? Mention its technological importance. (06 Marks)
- 4 a. What is electroless plating? Discuss the electro less plating of copper on PCB. (08 Marks)
b. Give the principle of cathodic protection. Explain sacrificial anode method with example. (06 Marks)
c. Explain differential metal corrosion with example. (06 Marks)
- 5 a. Define gross calorific value and explain determination of calorific value of a solid fuel using bomb calorimeter. (08 Marks)
b. Explain the modules, panels and arrays of photo voltaic cells. (06 Marks)
c. Define Knocking and explain its mechanism. (06 Marks)
- 6 a. What is Photo Voltaic cell? Explain the construction and working PV cell. (08 Marks)
b. Define reformation. Explain reformation of petrol with any four examples. (06 Marks)
c. Discuss the preparation of bio diesel. Mention its advantages. (06 Marks)
- 7 a. What is polymerization? Explain addition and condensation polymerization with example. (08 Marks)
b. What is glass transition temperature? Explain any two factors affecting T_g . (06 Marks)
c. Give the synthesis of :
i) PMMA
ii) Epoxy resin. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 8 a. Explain the free radical mechanism taking vinyl chloride as example. (08 Marks)
b. What are polymer composites? Explain the preparation of carbon fibre. (06 Marks)
c. Write synthesis of polyurathane and polycarbonate. (06 Marks)
- 9 a. Define COD. Discuss the experimental determination of COD of waste water. (08 Marks)
b. Discuss the softening of water by ion exchange process. (06 Marks)
c. What are nano materials? Explain the synthesis of nano materials by Sol-gel method. (06 Marks)
- 10 a. Write a note on :
i) Carbon nanotubes
ii) Dendrimers. (08 Marks)
b. Explain boiler scale and sludge formation. Mention any two disadvantages. (06 Marks)
c. What are fullerenes? Explain the synthesis. (06 Marks)

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