



CBCS SCHEME

15CHE12/22

First/Second Semester B.E. Degree Examination, Aug./Sept.2020

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 single electrode potential? Derive Nernst's equation for electrode potential. (06 Marks)
- b. Explain the construction and working of Calomel electrode with relevant cell reactions. (06 Marks)
- c. Explain construction and working of methanol-oxygen fuel cell. (04 Marks)

OR

- 2 a. A concentration cell was constructed by immersing two silver electrodes in 0.05 M and 1M AgNO₃ solution. Write the cell representation, cell reactions and calculate the emf of the cell. (06 Marks)
- b. Discuss the construction and working of Li-MnO₂ battery. (04 Marks)
- c. Explain the following characteristics of battery:
- i) Cell potential
 - ii) Cycle life
 - iii) Voltage
- (06 Marks)

Module-2

- 3 a. Define corrosion. Explain the mechanism of wet corrosion by taking iron as an example. (06 Marks)
- b. Explain the manufacturing process of double sided PCB with copper. (05 Marks)
- c. Discuss the sacrificial anodic method of control of corrosion. (05 Marks)

OR

- 4 a. What is anodic coating? Explain Galvanization and its application. (06 Marks)
- b. Explain pitting and waterline corrosion. (06 Marks)
- c. Explain following factors influencing nature of electrodeposit:
- i) Current density
 - ii) Metal Ion concentration
- (04 Marks)

Module-3

- 5 a. What is reformation of petrol? Give the reactions involved in reformation. (05 Marks)
- b. Discuss the construction and working of PV cells. (06 Marks)
- c. Write short notes on the following:
- i) Power Alcohol
 - ii) Antiknocking agents
- (05 Marks)

OR

- 6 a. Explain the determination of Calorific value of a solid fuel using Bomb Calorimeter. (06 Marks)
- b. Discuss the synthesis of petrol by Fischer-Tropsch process. (05 Marks)
- c. Describe the production of solar grade silicon by union carbide process. (05 Marks)

Module-4

- 7 a. Define polymerization. Explain the types of polymerization with example. (05 Marks)
b. Write the synthesis and properties of Silicon rubber. (05 Marks)
c. Explain the synthesis of PMMA and polycarbonate with uses. (06 Marks)

OR

- 8 a. What is conducting polymer? Explain the mechanism of conduction in polyaniline. (06 Marks)
b. Explain the following factors influencing the Tg value:
i) Intermolecular forces
ii) Flexibility
iii) Branching (06 Marks)
c. Write note on structure property relationship:
i) Strength
ii) Crystallinity (04 Marks)

Module-5

- 9 a. Define BOD. Explain the determination of dissolved oxygen by Winkler's method. (06 Marks)
b. With appropriate scheme discuss the synthesis of nanomaterials by sol-gel method. (06 Marks)
c. 25 ml of wastewater was mixed with 10 ml of $K_2Cr_2O_7$, acidified and refluxed. The unreacted $K_2Cr_2O_7$ acidified required 15.2 ml of 0.3 N FAS. In a blank titration 10 ml $K_2Cr_2O_7$ acidified required 19.4 ml of same 0.3 N FAS. Calculate COD. (04 Marks)

OR

- 10 a. What is desalination? Explain desalination of sea water by ion selective electro dialysis. (06 Marks)
b. Explain the scale and sludge formation in boiler. (06 Marks)
c. Write a note on dendrimers. (04 Marks)
