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CHE12/22

**First/Second Semester B.E. Degree Examination, Dec.09/Jan.10
Engineering Chemistry**

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. What are liquid crystals? Distinguish between thermotropic and lyotropic liquid crystals with suitable examples. (06 Marks)
 - b. Mention any four applications of liquid crystals. (04 Marks)
 - c. How is ethanol manufactured by the fermentation of molasses? (05 Marks)
 - d. Write an explanatory note on biofuels. (05 Marks)

- 2
 - a. What are chemical fuels? Give the classification of chemical fuels with suitable examples. (05 Marks)
 - b. Differentiate between gross calorific value and net calorific value. (05 Marks)
 - c. With a neat diagram explain the determination of calorific value of a solid fuel and explain the determination of water equivalent of calorimeter. (10 Marks)

- 3
 - a. Explain the determination of EMF of a galvanic cell. (08 Marks)
 - b. Derive the Nernst equation for single electrode potential and cell potential. (07 Marks)
 - c. Iron rod is immersed in 1.0 m FeSO₄ and Mn rod is immersed in 0.1 m MnSO₄. Calculate the voltage generated by coupling these two electrodes given standard reduction potential of Fe and Mn are -0.40 V and -1.18 V respectively. (05 Marks)

- 4
 - a. What is a primary battery? Explain the construction and working of dry cell. (06 Marks)
 - b. Explain the construction and working of lead acid battery. Give the reactions involved during discharging and charging. (06 Marks)
 - c. Mention the important characteristics of a battery. (04 Marks)
 - d. Give the construction and working of H₂-O₂ fuel cell. (04 Marks)

- 5
 - a. What is photochemical smog? How is it formed? What are its ill effects? (06 Marks)
 - b. Explain the Cottrell smoke precipitator to control particulates. (06 Marks)
 - c. Define BOD of sewage. What is its significance? How is it determined? (08 Marks)

- 6
 - a. What is corrosion? Explain the electrochemical theory of corrosion by taking iron as an example. (06 Marks)
 - b. Write a note on corrosion inhibitors. (04 Marks)
 - c. Define polarization, decomposition potential. (05 Marks)
 - d. What is metal finishing? Mention the technological importance of metal finishing. (05 Marks)

- 7
 - a. What is polymerization? Explain the different types of polymerization with a suitable example. (08 Marks)
 - b. Explain any two techniques of polymerization. (06 Marks)
 - c. Explain the mechanism of free radical polymerization by taking ethylene as an example. (06 Marks)

- 8
 - Write a brief note on the following:
 - a. Glass transition temperature.
 - b. Conducting polymers.
 - c. Epoxy resin.
 - d. Bakelite. (20 Marks)

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