

2002 SCHEME

USN

--	--	--	--	--	--	--	--	--	--

CHE12/22

First/Second Semester B.E. Degree Examination, June/July 2011 Engineering Chemistry

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What are the liquid crystals? Explain the molecular ordering in the following liquid crystal phases.
i) Chiral nematic ii) Smectic phase. (06 Marks)
- b. Distinguish between the thermotropic and lyotropic liquid crystals, with examples. (04 Marks)
- c. Explain the principle of a biosensor. (06 Marks)
- d. Explain the biosynthesis of acetic acid. (04 Marks)
- 2 a. Define the gross calorific value and the net calorific value. (04 Marks)
- b. On burning 0.83 gms of a solid fuel in a bomb calorimeter, the temperature of 3500 gms of water increased from 26.5 to 29.2°C. Water equivalent of calorimeter and latent heat of steam are 385 gms and 587 cal/gm respectively. If the fuel contains 0.7% hydrogen, calculate its gross and net calorific value. (06 Marks)
- c. Explain the fluidized bed catalytic method of obtaining gasoline. (06 Marks)
- d. Write a note on catalytic reforming of petrol. (04 Marks)
- 3 a. What is single electrode potential? Explain its origin. (05 Marks)
- b. Derive the Nernst equation for electrode potential. (05 Marks)
- c. What are the reference electrodes? How do you construct calomel electrode? Write the half cell reaction and advantages. (06 Marks)
- d. A cell is formed by dipping Ni-rod in 0.01 M NiSO₄ solution and Pb rod in 0.5 M PbSO₄ solution. The standard electrode potential value of Ni and Pb are - 0.24 v and -0.13 v respectively. Write cell representation and calculate Eemf of the cell at 298 k. (04 Marks)
- 4 a. What is battery? Explain the following battery characteristics.
i) Cycle life ii) Shelf life iii) Energy efficiency. (07 Marks)
- b. Explain the construction and working of Pb-acid battery. (07 Marks)
- c. What is the fuel cell? Explain the construction, working and application of H₂-O₂ fuel cell. (06 Marks)
- 5 a. Explain the sources, harmful effects and controlling measures of Oxides of Nitrogen and Sulphur. (08 Marks)
- b. Calculate the COD of the effluent sample, when 25 ml of the effluent requires 12.8 ml of 0.001 M K₂Cr₂O₇ for complete oxidation. (04 Marks)
- c. Write brief notes on :
i) Secondary treatment of sewage ii) BOD and COD. (08 Marks)
- 6 a. Explain the differential aeration corrosion, with example. (05 Marks)
- b. How do the following factors affect the rate of corrosion?
i) Nature of corrosion product ii) Ratio of anodic to cathodic area iii) Temperature. (06 Marks)
- c. Write notes on : i) Galvanizing ii) Tinning. (06 Marks)
- d. Write a note on corrosion inhibitors. (03 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.

- 7 a. What is electroplating? Explain any three methods employed to clean the surface of the metal to be electroplated. (08 Marks)
- b. Discuss the role of the following factors on the nature of the electrodeposit.
i) Complexing agent ii) Current density iii) Throwing power of the plating bath
iv) Temperature. (08 Marks)
- c. What is electroless plating? Mention its advantages over electroplating. (04 Marks)
- 8 a. What are polymers? Explain the types of polymerisation, with suitable examples. (06 Marks)
- b. Define glass transition temperature and mention its significance. (04 Marks)
- c. Give the synthesis, and uses of
i) Teflon ii) PMMA. (06 Marks)
- d. What is adhesive? Give the synthesis and applications of epoxy resin. (04 Marks)

* * * * *