FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

CBCS SCHEME

USN

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

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

cross lines on the remaining blank pages
equations written eg, 42+8 = 50, will be

Module-1

1 a. What are ion selective electrodes? Describe the construction of glass electrode with diagram. **(07 Marks)**

b. Define Single Electrode Potential. Derive the Nernst equation for single electrode potential. **(07 Marks)**

c. What are Fuel Cells? Give the differences between fuel cell and conventional cell. **(06 Marks)**

OR

2 a. EXplain the following battery characteristics
i) Energy efficiency ii) Cycle life iii) Self life. **(06 Marks)**

b. Describe the construction and working of Zn — Air cell. Mention its applications. **(07 Marks)**

c. What are concentration cells? Calculate the cell potential o f the following cell at 298K.
C_{ti} I C ^{2} (0.001 M) I I C ^{2} (0.1 M) I Cu. Write the cell reactions. **(07 Marks)**

Module-2

3 a. Explain the following factors affecting the rate of corrosion :
i) Ratio of anodic to cathodic area ii) pH **iii)** Temperature. **(06 Marks)**

b. What is Tinning? Explain the process of tinning by hot dipping process. **(07 Marks)**

c. What is Electroless Plating? Explain electroless plating of copper with suitable re actions. **(07 Marks)**

OR

4 a. Define Corrosion. Explain Electrochemical theory of corrosion by taking iron as an example. **(07 Marks)**

b. What is Metal finishing? What are the technological importance of metal finishing. **(06 Marks)**

c. Explain Electroplating of chromium for decorative and hard deposit. **(07 Marks)**

Module-3

5 a. What is Cracking? Explain fluidized bed catalytic cracking. **(07 Marks)**

b. Explain the synthesis of petrol by Fishcher Tropsch process. **(06 Marks)**

c. What are Photovoltaic cells? Explain construction and working of a photovoltaic Cell. **(07 Marks)**

OR

6 a. Define GCV and NCV. Calculate the gross and net calorific value of a sample of coal from the following data :
Weight of coal = 0.80 g ; Weight of water = 2000 g ; Water equivalent of calorimeter = 500g ; Rise in temperature = 2.5 $^{\circ}$C ; Specific heat of water = 4.187kJ/kg/ $^{\circ}$C % of hydrogen = 5% ; Latent heat of steam = 2457 kJ/kg. **(08 Marks)**

b. Explain Modules , Panels and Arrays of Photovoltaic cells. **(06 Marks)**

c. Explain purification of silicon by zone refining process. **(06 Marks)**

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Module-4

7 a. What is Polymerization? Explain addition and condensation polymerization with example. **(07 Marks)**

b. Explain the synthesis and applications of the following polymers :
i) Polyurethane ii) Silicone rubber. **(06 Marks)**

c. What are Polymer composites? Give the synthesis and applications of Kevlar. **(07 Marks)**

OR

8 a. In a polymer sample, 25% of molecules have molecular mass 1000 g/mol , 35% molecules have molecular mass 2000 g/mol and remaining molecules have molecular mass 3000 glmol. Calculate the number average and weight average molecular mass of the polymer. **(06 Marks)**

b. What is Glass transition temperature? Explain any THREE factors affecting the glass transition temperature. **(07 Marks)**

c. Explain free radical mechanism of addition polymerization of vinyl chloride. **(07 Marks)**

Module-5

9 a. EXplain the Activated Sludge method of treatment of sewage water. **(06 Marks)**

b. Define BOD and COD. In a COD test 26.5 cm' and 15.0cm^3 of 0.05N FAS solutions were required for blank and sample titrations respectively. The volume of the test sample used was 25cm^3. Calculate the COD of the test sample. **(07 Marks)**

c. What are Nano materials? Describe the synthesis of nano material by Sol gel method. **(07 Marks)**

OR

10 a. What is Desalination? Explain the desalination of sea water by reverse osmosis. **(06 Marks)**

b. Explain synthesis of nano materials by chemical vapour condensation process. **(06 Marks)**

c. Write a note on the following :
i) Carbon nano tubes and ii) Fullerenes. **(08 Marks)**

www.FirstRanker.com