Model Question Paper (CBCS) with effect from 2017-18

First/ Second Semester B.E. Degree (CBCS) Examination

Subject: Engineering Chemistry   **Subject Code: 17CHE12/22**
Duration: 3 Hours   **Max. marks: 100**

Note: Answer any FIVE full questions, choosing one full question from each module

Module-I

1 a.   What is single electrode potential? Derive the Nernst equation for single electrode potential.   (**7 marks)**
   b.   What are concentration cells? The cell potential of Cu concentration cell $Cu/CuSO_4$ (0.005M) // $CuSO_4$ (X)/ Cu is 0.0295 V at 25° C. Write the cell reaction and calculate the value of X   (**7 marks**)
   c.   What are fuel cells? Describe the construction and working of CH_3OH/O_2 fuel cell   (**6 marks**)

OR

2 a.   What are batteries? Explain the construction and working of Li-ion battery, mention its applications.   (**7 marks**)
   b.   Write a note on: i) Cell Potential ii) Capacity iii) cycle Life   (**6 marks**)
   c.   What are reference electrodes? Explain the construction and working ofCalomel electrode, mention the advantages of calomel electrode.   (**7 marks**)

Module-II

3 a.   What is metallic corrosion? Describe the electrochemical theory of Corrosion   (**7 marks**)
   b.   Explain: i) Differential metal corrosion   ii) Pitting corrosion   (**7 marks**)
   c.   What is electroplating? Explain the electroplating of Nickel   (**6 marks**)
OR

4 a.   What is meant by metal finishing? Write (any four) technological importants of metal Finishing.   (**5 marks**)
   b.   What is Electro-less plating? Explain the electro-less plating of copper   (**8 marks**)
   c.   What is cathodic protection? Explain sacrificial anode and impressed voltage method of cathodicprotection   (**7 marks**)

Module-III

5. a   Define the term Calorific value of fuel? Explain the experimental determination of calorific value of solid/liquid fuel using Bomb calorimeter   (**8 marks**)
   b.   0.75 g of coalsample (carbon 90%, H_2 5% and ash 5%) was subjected combustion in Bomb calorimeter. Mass water taken in the calorimeter was 2.5Kg and the water equivalent of calorimeter is 0.65Kg. The rise in temperature was found to be 3.2^oC. Calculate gross and net calorific values of the sample. Latent heat ofSteam = 2457KJ/Kg and specific heat of water = 4.187KJ/ Kg/^oC.   (**7 marks**)

c. What are solar cells? Explain the construction and working of a typical PV cell.

(5 marks)

OR

6. a. Explain the production solar grade Si by union carbide Process **(6 marks)**
    b. Explain modules, panels and arrays of PV cells. **(6 marks)**
    c. What is petroleum cracking? Explain the fluidised catalytic cracking process.

(8 marks)

Module-IV

7   a. Define polymer,explain free radical mechanism addition polymerisation of by taking Vinyl chloride as an example. **(7 marks)**

    b. Define number average and weight average molecular mass. In a polymer sample, 20% molecule of molecular mass 2000g/mol.,45% molecule of molecular mass 2500g/mol and remaining molecules of molecular mass 2700g/mol .Calculate number average and weight average molecular mass of the polymer. **(7 marks)**
    c. Explain the synthesis and applications of (i) Plexi glass and (ii)) Epoxy resin

(6 marks)

OR

8. a. What is glass transition temperature? Explain any three factors affecting theTg
(7 marks)
    b. What are elastomers? Write the synthesis and applications of silicone rubber
(6 marks)
    c. What are conducting polymers? Write the mechanism of poly aniline.
(7 marks)

Module-V

9. a. What is boiler feed water? Explain the scale and sludge formation in boiler
(7 marks)
    b. Define COD. In COD test 27.5 cm^3 and 13.2 cm^3 of 0.05 N FAS solution ere required for blank and sample titration respectively. The volume of the test sample used is 25 cm^3. Calculate the COD of the sample solution. **(8 marks)**
    c. What are nano-materials? Explain the synthesis of nano-material by sol-gel technique
(5 marks)

OR

10. a. What is desalination? Explain desalination of water by Electrodialysis **(8 marks)**
    b. Write a note on carbon nano tubes, mention its applications **(6 marks)**
    c. Write a note on Fullerenes, mention its applications. **(6 marks)**