

**Model Question Paper-2 with effect from 2018-19
(CBCS Scheme)**

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18CHE12/22

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

(Common to all Branches)

Time : 3 Hrs

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 Nernst equation for single electrode potential. **(6 Marks)**
b. Calculate the emf of a Cd-Cu cell in which Cd is in contact with 0.002 M CdSO₄ and Cu in contact with 0.02 M CuSO₄ solution. The standard emf of the cell is 0.74 V at 298 K **(7 Marks)**
c. Explain the construction and working of Ni-MH battery, mention its applications. **(7 Marks)**

OR

2. a. Explain the construction and working of Li-ion battery. Mention their advantages and applications. **(7 Marks)**
b. What are primary and secondary batteries? Explain with examples. **(6 Marks)**
c. A concentration cell was constructed by immersing two silver electrodes in 0.05 M and 1M AgNO₃ solutions. Give the cell representation, write the cell reactions and calculate the emf of the cell **(7 Marks)**

Module-II

3. a. Explain: (i) Water-line corrosion & (ii) Pitting corrosion. **(6 Marks)**
b. Explain the process of (i) galvanization & (ii) Anodizing **(7 Marks)**
c. What is electrolessplating? Explain the electrolessplating of nickel. **(7 Marks)**

OR

4. a. What is meant by metal finishing? Mention (any 6) technological importance of metal finishing. **(7 Marks)**
b. Define the terms (i) Polarization, (ii) Decomposition potential & (iii) Over voltage. **(6 Marks)**
c. What is cathodic protection? Explain (i) Sacrificial anodic & (ii) Impressed current methods **(7 Marks)**

Module-III

5. a. What are chemical fuels? How are they classified? (6 Marks)
b. What are fuel cells? How does a fuel cell differ from a battery? Give their advantages & disadvantages. (7 marks)
c. Explain the preparation of solar grade silicon by union carbide process. (7 marks)

OR

6. a. What are PV cells? Mention their advantages and limitations. (6 marks)
b. 0.85 g of coal sample (carbon 90%, H₂ 5% and ash 5%) was subjected to combustion in a Bomb calorimeter. Mass water taken in the calorimeter was 2000 g and the water equivalent of calorimeter was 600 g. The rise in temperature was found to be 3.5°C. Calculate gross and net calorific values of the sample. Latent heat of steam = 2457 KJ/Kg. (8 Marks)
c. Write a note on (i) Power alcohol & (ii) Unleaded petrol (6 Marks)

Module-IV

- 7 a. What are the causes, effects and disposal methods of e-waste? (7 Marks)
b. What are the sources, effects and control of mercury pollution? (7 Marks)
c. In a COD test 30.2 cm³ and 14.5 cm³ of 0.05 N FAS solution are required for blank and sample titration respectively. The volume of the test sample used was 25 cm³. Calculate the COD of the sample solution. (6 Marks)

OR

8. a. Explain the softening of water by ion exchange method. (6 Marks)
b. Explain the activated sludge treatment of sewage of water. (7 Marks)
c. Explain the mechanism of photochemical smog. (7 Marks)

Module-V

9. a. Explain the theory, instrumentation and applications of atomic absorption spectroscopy. (7 Marks)
b. Explain the theory and instrumentation of potentiometry (7 Marks)
c. Explain the synthesis of nano-material by sol-gel technique. (6 Marks)

OR

10. a. Write a note on fullerenes. Mention their applications. (7 Marks)
b. What are nano-materials? Explain the synthesis of nano-materials by chemical vapor deposition. (7 Marks)
c. Explain the theory and instrumentation of colorimetry. (6 Marks)