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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2023 Semester End Main Examinations

Programme: B.E. **Semester: I**
Branch: CS/CS-IOT/AI&DS **Duration: 3 hrs.**
Course Code: 22CH1BSCCS **Max Marks: 100**
Course: Applied Chemistry for Computer Science Engineering **Date: 08.04.2023**
Stream

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Demonstrate the application of glass electrode to determine pH of a solution. **05**

b) Evaluate EMF of the concentration cell $Cu|Cu^{+2}(0.035 M) \| Cu^{+2}(0.125M) |Cu$ at 35 °C. Justify the name given to such a cell. **05**

c) Suggest and explain a method to protect underground iron pipe from corrosion. **04**

d) Predict the effect of (i) relative area of anode and cathode and (ii) pH on the rate of corrosion. **06**

OR

2 a) Illustrate differential metal corrosion with a suitable example. **05**

b) Describe the construction and working of a calomel electrode. **05**

c) Analyze the advantages of electroless plating. **04**

d) Evaluate the corrosion penetration rate in mpy and mmpy of brass which is exposed to a corrosion environment under the following conditions: time of exposure is 453 days, density of brass is 8.73 g/cm^3, weight loss is 650 g, area exposed is 52 inch^2. Predict the metal that dissolves first during corrosion of brass. **06**

UNIT - II

3 a) Evaluate the gross and net calorific value of a biodiesel sample from the following data. Mass of biodiesel is 1.32 g, weight of water in the calorimeter and water equivalent of calorimeter is 1.35 kg and 0.38 kg respectively. Raise in temperature of water is 4.8 °C. Specific heat of water is 4.2 kJ/kg/°C and percentage of hydrogen in the biodiesel is 8. Latent heat of steam is 2454 kJ/kg. **05**

b) Describe the construction and working of a QDSSC. **05**

c) Exemplify reformation of petrol through any two reactions with conditions and justify its necessity. **04**

d) Explain the battery characteristics: (i) voltage and (ii) capacity **06**

UNIT - III

4 a) Calculate the number average molecular weight and weight average molecular weight of a polyaniline sample made up of 150 molecules with 3100 g molecular mass, 230 molecules with 7800 g molecular mass and 310 molecules with 9500 g molecular mass. **05**

   b) Illustrate the synthesis of PMMA and butyl rubber. **05**

   c) Justify that polyglycolic acid is a biodegradable polymer. Mention its applications. **04**

   d) Explain the influence of (i) flexibility and (ii) tacticity on the Tg of a polymer. **06**

OR

5 a) Justify that oxidatively doped polyacetylene is a conducting polymer with a mechanism. **05**

   b) Describe the synthesis of Kevlar fiber and mention its applications. **05**

   c) Write the structure of (i) UF resin and (ii) nitrile rubber. **04**

   d) Illustrate that (i) chemical resistance and (ii) tensile strength of a polymer are structure dependent. **06**

UNIT - IV

6 a) Describe the construction and working of a QLED. **05**

   b) Illustrate different types of electronic transitions using Jablonski diagram. **05**

   c) Highlight the applications of liquid crystals. **04**

   d) Explain the working of charge transfer type and resistor type memory devices. **06**

UNIT - V

7 a) Describe the hydrometallurgical extraction of copper from E-waste. **05**

   b) Explain the principle and instrumentation of a colorimetric optical sensor. **05**

   c) Bring out the differences between COD and BOD. Justify why COD>BOD. **04**

   d) Calculate temporary, permanent and total hardness of a water sample from the following data. Volume of 0.015 M EDTA required for titration of 25 mL hard water before boiling is 12.5 mL. Volume of same EDTA solution required for titration of 25 mL water sample after boiling is 8.5 mL. **06**

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