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

Autonomous Institute Affiliated to VTU

February / March 2025 Semester End Main Examinations

Programme: B.E.

Semester: I / II

Branch: Electrical Engineering Stream

Duration: 3 hrs.

Course Code: 22CY1BSCEE / 22CY2BSCEE

Max Marks: 100

Course: Applied Chemistry for Electrical 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 | | | CO | PO | Marks | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------|----------|
| Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice. | 1 | a) | Elaborate on the following corrosion control methods i) anodization and ii) sacrificial anode method. | <i>CO1</i> | <i>PO1</i> | 8 |
| | | b) | Illustrate differential aeration corrosion with appropriate example. Justify that pitting corrosion is a dangerous type of corrosion. | <i>CO2</i> | <i>PO2</i> | 6 |
| | | c) | What are concentration cells. A concentration cell is constructed by dipping Cd electrodes in 0.15 and 0.35 M CdSO ₄ solutions at 31 °C. Calculate the EMF of the cell and write the overall cell reaction. | <i>CO2</i> | <i>PO2</i> | 6 |
| OR | | | | | | |
| | 2 | a) | Define corrosion. Using electrochemical theory of corrosion explain rusting of iron. | <i>CO1</i> | <i>PO1</i> | 8 |
| | | b) | Explain the determination of pH using glass electrode. | <i>CO1</i> | <i>PO1</i> | 6 |
| | | c) | A steel of area 100 inch ² is exposed to air near the seashore. After 1 year it was found that the steel sheet has lost 485g due to corrosion. What is the value of CPR in mils/year and in mm/year? Can such steel sheet be applicable for the construction purpose where the steel sheet is exposed? | <i>CO2</i> | <i>PO2</i> | 6 |
| UNIT - II | | | | | | |
| | 3 | a) | Describe with a neat diagram fluidized bed catalytic cracking. Justify the need for cracking. | <i>CO1</i> | <i>PO1</i> | 8 |
| | | b) | Define GCV. From the following data calculate the rise in temperature of 2560 g of water, if 0.9 g of coal is completely burnt in a bomb calorimeter whose water equivalent mass is 440 g. The GCV of coal is 34450 kJ kg ⁻¹ and specific heat of water is 4.187 kJ kg ⁻¹ k ⁻¹ . | <i>CO2</i> | <i>PO2</i> | 6 |
| | | c) | Describe the production of biodiesel. Justify: Biodiesel is a green fuel. | <i>CO1</i> | <i>PO1</i> | 6 |
| OR | | | | | | |

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|-------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----|-----------|---|
| | 4 | a) | Explain the production, storage and disadvantages of Hydrogen fuel. | CO1 | PO1, 7 | 8 |
| | | b) | Explain the working principle and construction of Quantum dots sensitized solar cells(QDDSCs). | CO1 | PO1 | 6 |
| | | c) | Describe the classification of batteries with suitable examples. | CO1 | PO1 | 6 |
| UNIT – III | | | | | | |
| 5 | a) | Define conducting polymers. Describe the conduction mechanism of polyacetylene. | CO2 | PO2 | 8 | |
| | b) | Calculate the number average molecular weight and weight average molecular weight of Polypropylene with the composition: CH_3 $\text{ } \backslash$ $[-\text{CH}_2-\text{CH}-]_{100} \text{ 30 %}$ CH_3 $\text{ } \backslash$ $[-\text{CH}_2-\text{CH}-]_{200} \text{ 30 %}$ CH_3 $\text{ } \backslash$ $[-\text{CH}_2-\text{CH}-]_{300} \text{ 40 %}$ Given: Atomic weight of C=12, H=1 | CO2 | PO2 | 6 | |
| | c) | What are Biodegradable polymers? Explain the synthesis of poly lactic acid. | CO1 | PO1 | 6 | |
| | | OR | | | | |
| 6 | a) | Validate the following: (i) All simple organic molecules do not produce polymers. (ii) Nylon is stronger than polyethylene. (iii) Polymer composites are good structural materials. | CO2 | PO2 | 8 | |
| | b) | Define Glass Transition Temperature. Describe any two factors effecting the Glass Transition Temperature. | CO2 | PO2 | 6 | |
| | c) | Describe the synthesis, properties and applications of Kevlar. | CO1 | PO1 | 6 | |
| UNIT – IV | | | | | | |
| 7 | a) | Outline the classification of electronic memory devices. | CO1 | PO1 | 8 | |
| | b) | With a neat diagram describe the construction and working of QLED. | CO1 | PO1 | 6 | |
| | c) | Describe the production of electronic grade silicon by any suitable method. | CO1 | PO1 | 6 | |
| | | OR | | | | |
| 8 | a) | Outline the classification of electronic memory materials. | CO1 | PO1 | 8 | |
| | b) | Describe the Band theory with suitable example. | CO1 | PO1 | 6 | |
| | c) | Define Liquid crystals. Explain the classification of Liquid crystals. | CO1 | PO1 | 6 | |

| UNIT – V | | | | | |
|-----------------|----|----|------------------------------------------------------------------------------------------------|------------|----------------------------|
| | 9 | a) | What are optical sensors? Explain the colorimetric estimation of copper using optical sensors. | <i>CO5</i> | <i>PO1, 2</i> 8 |
| | | b) | Describe the synthesis of graphene oxide by Hummer's method. | <i>CO1</i> | <i>PO1</i> 6 |
| | | c) | What is e-waste? Explain the need for e-waste management. | <i>CO1</i> | <i>PO1</i> 6 |
| OR | | | | | |
| | 10 | a) | Analyze the dependency of properties of nanomaterials on their size. | <i>CO2</i> | <i>PO2</i> 8 |
| | | b) | Describe the construction and working of a gas sensor. | <i>CO1</i> | <i>PO1</i> 6 |
| | | c) | Explain the estimation of acid mixture using conductometric sensors. | <i>CO5</i> | <i>PO1, 2</i> 6 |

B.M.S.C.E. - ODD SEM 2024-25