U.S.N.									

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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E.   **Semester: I / II**
Branch: Mechanical Engineering Stream   **Duration: 3 hrs.**
Course Code: 22CY1BSCME / 22CY2BSCME   **Max Marks: 100**
Course: Applied Chemistry for Mechanical Engineering Stream

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

<table>
<tr><td colspan="3" rowspan="2"></td><th>UNIT - I</th><th>CO</th><th>PO</th><th>Marks</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>a)</td><td></td><td>Define metallic corrosion. Explain electrochemical theory of corrosion by taking rusting of iron as an example.</td><td>CO1</td><td>PO1</td><td>8</td></tr>
<tr><td></td><td>b)</td><td></td><td>Explain the construction and working of calomel electrode.</td><td>CO1</td><td>PO1</td><td>6</td></tr>
<tr><td></td><td>c)</td><td></td><td>Discuss anodization of aluminium. Mention the advantages of anodization.</td><td>CO1</td><td>PO1</td><td>6</td></tr>
<tr><td colspan="3"></td><td align="center">OR</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>a)</td><td></td><td>What are ion selective electrodes? Explain the construction, working and advantages of glass electrode.</td><td>CO1</td><td>PO1</td><td>8</td></tr>
<tr><td></td><td>b)</td><td></td><td>Elaborate the corrosion protection of buried metal structures by sacrificial anode method. What are the advantages of this method over impressed current method?</td><td>CO2</td><td>PO2</td><td>6</td></tr>
<tr><td></td><td>c)</td><td></td><td>Illustrate the principle of working of a concentration cell. Calculate EMF of the following concentration cell at 25º C
Cu (S) / Cu^{2+} (0.05M) // Cu^{2+} (5M) / Cu (S)
Write the half-cell reactions and net cell reaction.</td><td>CO2</td><td>PO2</td><td>6</td></tr>
<tr><td colspan="3"></td><td align="center">UNIT - II</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>a)</td><td></td><td>What are chemical fuels? Explain the determination of calorific value of a solid/liquid fuel using bomb calorimeter.</td><td>CO1</td><td>PO1</td><td>8</td></tr>
<tr><td></td><td>b)</td><td></td><td>Explain fluidized bed catalytic cracking with regeneration of catalyst.</td><td>CO1</td><td>PO1</td><td>6</td></tr>
<tr><td></td><td>c)</td><td></td><td>On burning 1.15g of a coal sample in a bomb calorimeter, the temperature of 3.5kg of water in the calorimeter increased from 26.5^{0}C to 28.5^{0}C. Water equivalent of calorimeter is 325g. Specific heat of water is 4.187 KJ/Kg/ ºC and latent heat of steam is 2454 kJ/kg. If the fuel contains 4% hydrogen, calculate its gross and net calorific values.</td><td>CO2</td><td>PO2</td><td>6</td></tr>
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SUPPLEMENTARY EXAMS 2024

			UNIT - III			
4	a)		Define glass transition temperature (Tg). Explain any three factors which affects Tg of a polymer.	CO1	PO1	**8**
	b)		Explain the synthesis, properties and applications of polycarbonates.	CO1	PO1	**6**
	c)		In a sample of a polymer, 100 molecules have molecular mass 10^3 g/mol, 250 molecules have molecular mass 10^4 g/mol and 300 molecules have molecular mass 10^5 g/mol. Calculate the number average, and weight average molecular mass of the polymer. Calculate PDI.	CO2	PO2	**6**
			OR			
5	a)		What are polymer composites? Explain the synthesis, properties and applications of Kevlar fibre.	CO2	PO2	**8**
	b)		Explain the synthesis of i) PMMA ii) Butyl rubber	CO1	PO1	**6**
	c)		What are bio-degradable polymers? Explain the synthesis and applications of polyglycolic acid.	CO3	PO7	**6**
			UNIT - IV			
6	a)		List the composition, properties and application of stainless steel alloy.	CO1	PO1	**8**
	b)		Elaborate on the properties and applications of pervoskities.	CO2	PO2	**6**
	c)		Discuss classification, properties and applications of lubricants.	CO1	PO1	**6**
			UNIT - V			
7	a)		Discuss the phase diagram of Pb-Ag system.	CO1	PO1	**8**
	b)		Explain desalination of water by electrodialysis.	CO1	PO1	**6**
	c)		Explain the determination of copper by colorimetric method.	CO5	PO3	**6**

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