U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main 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.

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.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Explain the construction and working of glass electrode. Mention any one limitation of it.	CO1	PO1	**6**
	b)		What is corrosion? Explain the electrochemical theory of corrosion by taking iron as an example with necessary reactions.	CO2	PO2	**8**
	c)		Interpret the effect of following factors in determining the rate of corrosion (i) pH of the medium ii) Nature of the corrosion product.	CO3	PO7	**6**
			OR			
2	a)		Explain the construction and working of calomel electrode.	CO1	PO1	**6**
	b)		Bring out the differences between electroplating and electroless plating. Explain the process with reactions of electroless plating of copper on a plastic object.	CO3	PO7	**8**
	c)		Justify the following statements: (i) Aluminium is a passive metal (ii) Pitting corrosion is localized and intense corrosion	CO2	PO2	**6**
			UNIT - II			
3	a)		Biodiesel is considered as a green fuel, justify the statement and explain the synthesis of biodiesel by trans-esterification reaction.	CO3	PO7	**6**
	b)		What is meant by knocking in IC engine? Explain any two reasons for it.	CO2	PO2	**8**
	c)		Outline the construction and working of the rechargeable $LiCoO_2$ battery with a neat diagram.	CO2	PO2	**6**

			UNIT - III			
	4	a)	What is glass transition temperature (Tg) of a polymer? Explain the influence of flexibility of polymer chain & molecular weight of polymer on Tg of polymers.	CO1	PO1	**6**
		b)	By selecting the appropriate monomers and reaction conditions, write a synthetic route for the following polymers (i) PMMA (ii) Polycarbonate Mention any one applications of above polymers.	CO1	PO1	**8**
		c)	What are polymer composites? Illustrate different methods for the synthesis of polymer composites with applications.	CO2	PO2	**6**
			OR			
	5	a)	Explain how structure of a polymer influences the following properties (i) Tensile strength (ii) Crystallinity	CO2	PO2	**6**
		b)	Explain how the following polymers are produced and mention their applications (i) UF resin (ii) Polyglycolic acid	CO2	PO2	**8**
		c)	Outline the synthesis and applications of nitrile rubber.	CO2	PO2	**6**
			UNIT - IV			
	6	a)	With examples, explain the following size dependent properties of nano materials. i) Optical properties ii) Surface area	CO3	PO7	**6**
		b)	Illustrate the classification of ceramics based on the chemical composition. List out any two applications of it.	CO2	PO2	**8**
		c)	Carbon nanotube has extraordinary thermal, mechanical and electrical properties. How it can be prepared by modified chemical vapor deposition process? Give any one limitation of the above method.	CO2	PO2	**6**
			UNIT - V			
	7	a)	Explain the determination of COD of an industrial waste water sample.	CO5	PO3	**6**
		b)	Discuss the application of phase rule to a one-component water system.	CO1	PO1	**8**
		c)	Using colorimetric method, explain estimation of copper from copper sulfate solution. Mention the principle, instrumental setup and procedure for the above method.	CO1	PO1	**6**

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