U.S.N.										

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**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 23CY1ETNST **Max Marks: 100**
Course: Nanoscience and Technology

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)	Illustrate structural features, properties and applications of carbon nanotubes.	CO1	PO1	**8**
	b)	Justify the following: i) Band gap of nanomaterials varies with size of nanoparticles. ii) Nano particles exhibit good catalytic properties compared to their bulk.	CO1	PO1	**6**
	c)	Describe the classification of nanomaterials based on their dimension with suitable examples.	CO1	PO1	**6**
		OR			
2	a)	Discuss the influence of size on the magnetic and mechanical properties of materials.	CO1	PO1	**8**
	b)	Justify: i) Quantum dots are 0-D nanomaterials ii) Melting temperature of nanoparticles are less than their bulk forms.	CO1	PO1	**6**
	c)	With appropriate examples, describe the applications of metal nanoparticles.	CO1	PO1	**6**
		UNIT – II			
3	a)	Compare bottom-up and top-down approaches used in nanomaterials synthesis. Mention their advantages and disadvantages.	CO2	PO1,2	**8**
	b)	Explain the synthesis of nanomaterials by co-precipitation method.	CO2	PO1,2	**6**
	c)	Discuss the principle, applications and advantages of Transmission Electron Microscopy (TEM) technique.	CO2	PO1,2	**6**
		OR			
4	a)	Elaborate the principle and applications of powder XRD technique in the characterization of nanomaterials.	CO2	PO1,2	**8**
	b)	Explain the synthesis of nanomaterials by chemical vapour deposition (CVD) technique.	CO2	PO1,2	**6**

		c)	Describe the combustion synthesis of metal oxide nanoparticles.	CO2	PO1,2	**6**
			UNIT – III			
	5	a)	Discuss various types of nanomaterials used in drug delivery.	CO3	PO6,7	**8**
		b)	Illustrate the use of nanomaterials in electrochemical sensor.	CO3	PO6,7	**6**
		c)	How nanomaterials are useful in future memory and display devices?	CO3	PO6,7	**6**
			OR			
	6	a)	Discuss the use of nanomaterials in battery technology with suitable examples.	CO3	PO6,7	**8**
		b)	Mention the role of nanomaterials in agriculture.	CO3	PO6,7	**6**
		c)	Give the applications of nanomaterials in military and aerospace.	CO3	PO6,7	**6**
			UNIT –IV			
	7	a)	Analyze the role of nanomaterials in water filtration.	CO3	PO6,7	**8**
		b)	Describe the working principle of nano photocatalysts in removal of toxic chemicals from water.	CO3	PO6,7	**6**
		c)	Discuss the role of carbon-based nano adsorbents used in water purification.	CO3	PO6,7	**6**
			OR			
	8	a)	Justify the role of following on photocatalytic activities of nanoparticles i) electron-hole recombination rate ii) temperature and iii) amount of catalyst	CO3	PO6,7	**8**
		b)	Illustrate the defluorination of water by nano adsorbents.	CO3	PO6,7	**6**
		c)	Demonstrate with suitable example removal of heavy metal ions from waste water.	CO3	PO6,7	**6**
			UNIT –V			
	9	a)	Explain the future implications of nanomaterials.	CO3	PO6,7	**8**
		b)	Describe the toxicological threats upon exposure to nanomaterials.	CO3	PO6,7	**6**
		c)	Discuss the positive impacts of nanotechnology on the environment.	CO3	PO6,7	**6**
			OR			
	10	a)	Analyze the importance of environmental surveillance with respect to nanomaterials.	CO3	PO6,7	**8**
		b)	Describe the impact of nanotechnology in the field of medicine.	CO3	PO6,7	**6**
		c)	Justify that nanomaterials play an important role in the field of artificial intelligence and information technology.	CO3	PO6,7	**6**

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