Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3171931 Date:11-12-2024

Subject Name: Nanotechnology and surface Engineering

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain how the nano size of the material affects the properties of materials.	**03**
	(b)	State different physical and chemical properties of nanomaterial.	**04**
	(c)	Explain classification of nanomaterials in detail.	**07**
Q.2	**(a)**	Discuss the role of nanomaterials in the advancement of society.	**03**
	(b)	Write full form of: SEM, AFM, TEM and XRD.	**04**
	(c)	Explain engineering applications of nanoscience and nanotechnology in the field of nanosensors and nanocatalysts.	**07**
		OR	
	(c)	Explain engineering applications of nanoscience and nanotechnology in the field of food and agriculture industry.	**07**
Q.3	**(a)**	Differentiate between top down approach and bottom up approach.	**03**
	(b)	Explain flame decomposition of metal organic precursors method.	**04**
	(c)	Explain synthesis of nanomaterial by sol-gel method.	**07**
		OR	
Q.3	**(a)**	State advantages and disadvantages of spray pyrolysis method.	**03**
	(b)	Explain RF sputtering process.	**04**
	(c)	Explain synthesis of nanomaterial by chemical vapour deposition.	**07**
Q.4	**(a)**	State the advantages of surface coating.	**03**
	(b)	State advantages, disadvantages and applications of SEM.	**04**
	(c)	Draw a neat sketch and explain AFM.	**07**
		OR	
Q.4	**(a)**	Discuss the scope of surface engineering for different engineering materials.	**03**
	(b)	State advantages, disadvantages and applications of TEM.	**04**
	(c)	List mechanical surface preparation methods. Explain any one in detail.	**07**
Q.5	**(a)**	Classify surface modification methods.	**03**
	(b)	State advantages and disadvantages of Ion Implantation.	**04**
	(c)	Explain friction stir processing with a neat sketch.	**07**
		OR	
Q.5	**(a)**	List three different types of laser surface modification techniques.	**03**
	(b)	State advantages and disadvantages of physical vapour deposition.	**04**
	(c)	Explain surface modification by use of directed energy beams.	**07**

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