Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3171931 Date: 30/06/2023

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)**	What is nanotechnology? Discuss the applications of this technology.	**03**
	(b)	Who discovered the word nanotechnology? Describe history of nanotechnology with example.	**04**
	(c)	Explain fabrication approaches of nanomaterials. Explain briefly CVD process.	**07**
Q.2	**(a)**	What is atomic force microscopy?	**03**
	(b)	What are the differences between AFM, SEM and TEM?	**04**
	(c)	Explain with neat sketch SEM.	**07**
		OR	
	(c)	Briefly explain laser ablation method with sketch.	**07**
Q.3	**(a)**	What do you mean by friction stir process?	**03**
	(b)	What is spectroscopy? Explain UV visible spectroscopy with neat sketch.	**04**
	(c)	Which are the mechanical techniques for fabrication of nanomaterials? Explain any one mechanical technique with sketch.	**07**
		OR	
Q.3	**(a)**	Explain sol gel process with neat sketch.	**03**
	(b)	Explain sand blasting method used for surface preparation.	**04**
	(c)	Explain X-Ray diffraction (XRD)	**07**
Q.4	**(a)**	What do you mean by nano sensors?	**03**
	(b)	Discuss top down and bottom-up approach synthesis.	**04**
	(c)	Explain hydro blasting process with sketch.	**07**
		OR	**07**
Q.4	**(a)**	What is spray pyrolysis?	**03**
	(b)	Classify methods for synthesis of nano materials.	**04**
	(c)	Explain transmission electron microscopy (TEM).	**07**
Q.5	**(a)**	What is electro chemical surface preparation?	**03**
	(b)	What are the types of nano coatings? State its applications.	**04**
	(c)	Briefly explain electron beam lithography.	**07**
		OR	

Q.5	**(a)**	What do you mean by surface modification?	**03**
	(b)	Explain sputtering and ion implantation.	**04**
	(c)	Where are the applications of surface engineering? Explain shot peening method with neat sketch.	**07**

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