Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2170508 **Date:30/01/2021**

Subject Name:Nano Technology

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	List the methods used in nano synthesis.	**03**
	(b)	In what manner nano material differ from the bulk material ? List the property that improved or deprived at nano scale compare to bulk material.	**04**
	(c)	Define the nano material? Classify the nanostructured materials with suitable example.	**07**
Q.2	**(a)**	What is band gap? How it differ in bulk material and nano material?	**03**
	(b)	Differentiate between RF sputtering and DC sputtering.	**04**
	(c)	Explain the process of etching. Compare the dry etching and wet etching.	**07**
Q.3	**(a)**	What is Nano-lithography? Discuss the step involved in it.	**03**
	(b)	Write in brief about application of nano material as a sensor and catalyst.	**04**
	(c)	Explain the hydrothermal and solvo thermal methods for nano synthesis. How they differ from each other?	**07**
Q.4	**(a)**	What do you understand by Precursors? What is the role of precursor in nano synthesis.	**03**
	(b)	Differentiate Co-precipitation and precipitation method for making Nano-particles.	**04**
	(c)	Explain the gas-phase synthesis of semiconductor nano particles.	**07**
Q.5	**(a)**	Differentiate between graphite and graphene? Write the application of grephene oxide	**03**
	(b)	Discuss the any one method involving top-down approach for nano synthesis.	**04**
	(c)	State general methods of preparation of quantum dots and illustrate any one in details.	**07**
Q.6	**(a)**	State and explain the principle of Scanning Electron Microscopy.	**03**
	(b)	Discuss the any one method involving bottom-up approach for nano synthesis.	**04**
	(c)	Discuss the principle and applications of vapor condensation method for nano materials synthesis.	**07**
Q.7	**(a)**	Explain the application of UV/Visible Spectroscopy.	**03**
	(b)	State the different aspects of crystallite information that can be investigated using SEM or TEM?	**04**
	(c)	Discuss principle of X-Ray Diffraction. How the XRD is used for the characterization of nano material.	**07**

Q.8	**(a)**	Discuss briefly the application of nanotechnology in cosmetics.	**03**
	(b)	Discuss the application of nanotechnology in Food and agricultural industries and effective water management	**04**
	(c)	Explain the principle, working and construction of Atomic Force Microscopy.	**07**

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