

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3170509**Date:10-01-2023****Subject Name:Nanoscience and Technology****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) Differentiate Wet and Dry Etching.	03
	(b) Briefly explain with an example the synthesis of nanomaterials in structured media.	04
	(c) Briefly compare between 'Top-down' and 'Bottom-up' approaches of fabrication of nanomaterials. Give examples of reduced dimensionality system (1D, 2D and 3D confinements).	07
Q.2	(a) Discuss steps of Nano-lithography.	03
	(b) Discuss Fabrication of Nano-wires using Template fabrication.	04
	(c) Describe spray pyrolysis method for synthesis of ceramic nanopowder.	07
	OR	
	(c) Discuss inert gas evaporation technique.	07
Q.3	(a) Discuss type of micro emulsion.	03
	(b) Discuss preparation of Nano-filter.	04
	(c) With the help of diagram explain construction and working of Boat reactor.	07
	OR	
Q.3	(a) What is nanosensor? Discuss theory advantages over their micro-scale and macro-scale counterparts.	03
	(b) Discuss Sol-gel technique.	04
	(c) Explain the principle of lithographic process with schematic diagram. State the advantages and disadvantages of this process.	07
Q.4	(a) Discuss the principle of Atomic force Microscope	03
	(b) Discuss application of Nano oxide as protective coatings.	04
	(c) Discuss principle of X-Ray Diffraction with its application.	07
	OR	
Q.4	(a) Show various types of structure of Carbon nano-tubes.	03
	(b) State a few safety and storage considerations of nanomaterial.	04
	(c) Discuss the differences between scanning electron microscopy (SEM) and transmission electron microscopy (TEM).	07
Q.5	(a) State and explain the principle of Scanning Electron Microscopy (SEM)	03
	(b) Discuss various application of Nano-technology in medical Science.	04
	(c) What is self-assembly? Show examples of Self-assembly in Biology.	07

OR

- Q.5** (a) State if there is any disadvantage of using nanomaterials. **03**
(b) What is quantum dot? Give examples and state its industrial uses. **04**
(c) Discuss application of nanoscience and technology in food and agricultural industry. **07**
