

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024****Subject Code:3152112****Date:05-12-2024****Subject Name: Nano Materials****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) Describe advantages of sol gel process compare to other nano-material production methods.	03
	(b) Explain the sol-gel technique for nano-material production.	04
	(c) Write a note on carbon nanotubes and their applications.	07
Q.2	(a) Differentiate in chemical vapour deposition and physical vapour deposition for nano-material production.	03
	(b) Explain the physical vapour deposition technique for nano-material production.	04
	(c) “Bottom-up technique is more convenient for nano fabrication”- explain and justify.	07
	OR	
	(c) Describe the statement in reference to nano-materials: “There is plenty of room at the bottom.”	07
Q.3	(a) Enlist different techniques for Characterization of nano-materials.	03
	(b) Discuss the Size dependence of material at nano scale.	04
	(c) What are Nano-materials? Discuss applications of Nano-materials in: i. Sports goods and equipment’s ii. Health care and medicine.	07
	OR	
Q.3	(a) Explain why materials behave so differently at nano-scale?	03
	(b) Write the historical developments of nanotechnology.	04
	(c) Define Nano technology. Describe applications of Nanotechnology in i. Automobiles and Aerospace ii. Cosmetic products.	07
Q.4	(a) Explain the term fullerene.	03
	(b) Write a note on graphenes and its applications.	04
	(c) Describe effect of particle size on mechanical properties of nano-materials.	07
	OR	
Q.4	(a) What are Superplasticity Nanocomposites? Explain.	03
	(b) Write a note on bucky balls and its applications. Draw the structure.	04
	(c) For nano-materials describe the inverse Hall-Petch relationship.	07
Q.5	(a) Write a note on quantum wires.	03
	(b) What are Semiconducting nano-materials? Discuss their properties.	04
	(c) Explain the rapid solidification processing for nano-material production.	07
	OR	
Q.5	(a) What are Magnetic nano-materials? Discuss applications.	03
	(b) What are nano ceramics? Discuss properties and applications.	04
	(c) Explain the mechanism of High Energy Ball Milling Process for nano-material production. Give the factors affecting process.	07
