

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VII EXAMINATION – SUMMER 2026****Subject Code:3170509****Date:29-05-2026****Subject Name: Nanoscience and Technology****Time: 02:30 PM TO 05:00 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) Define nanotechnology. List commonly found nanomaterial in nature.	03
	(b) Describe unique properties of 1D, 2D and 3D nanomaterials giving suitable examples of each.	04
	(c) Describe applications of nanotechnology in dyes and coating industries.	07
Q.2	(a) List the unique properties and applications of quantum dots.	03
	(b) State advantages and disadvantages of top-down and bottom-up methods of synthesis of nanomaterials.	04
	(c) Explain with suitable example the variation in physical and chemical properties of material in nano scale level.	07
	OR	
	(c) Explain structure, types, properties and applications of carbon nanotubes.	07
Q.3	(a) Compare CVD and PVD methods of synthesis of nanomaterials.	03
	(b) Briefly explain Photolithography.	04
	(c) Explain with necessary diagrams the synthesis of nanomaterials using Sol gel method.	07
	OR	
Q.3	(a) Differentiate carbon nanotubes from bucky balls.	03
	(b) Briefly explain electron beam lithography.	04
	(c) Explain with necessary diagrams the synthesis of nanomaterials using the chemical vapor deposition.	07
Q.4	(a) Explain the principle and applications of Fourier Transform Infrared spectroscopy.	03
	(b) Discuss inert gas evaporation technique.	04
	(c) Explain principle, construction and working of transmission electron microscope	07
	OR	
Q.4	(a) Explain the principle and applications of XRD analysis.	03
	(b) Discuss Etching process and its application.	04
	(c) Explain principle, construction and working of Scanning electron microscope.	07
Q.5	(a) Explain the principle of molecular self assembly of synthesis of nanomaterials.	03
	(b) Explain Beer Lambert law in context with UV-VIS spectroscopy.	04
	(c) Describe the applications of nanomaterials in drug delivery and diagnostics.	07
	OR	
Q.5	(a) Explain Ball milling for synthesis of nano materials.	03

- (b)** Explain Stokes-Einstein relation in the context to dynamic light scattering (DLS) method for particle size distribution. **04**
- (c)** Describe applications of nanomaterials in wastewater treatment and environment. **07**
