

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:3171931

Date:23-05-2025

Subject Name:Nanotechnology and surface Engineering

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) Explain engineering scale of nano technology.	03
	(b) Who discovered the word nanotechnology? Describe history of nanotechnology with example.	04
	(c) Discuss applications of Nano technology and its merits in the field of engineering.	07
Q.2	(a) Categorize the different Nano materials along with their sizes.	03
	(b) Briefly explain vapor condensation method.	04
	(c) Enlist different tools used in characterization of nanomaterials. Briefly explain XRD with its advantages and applications.	07
	OR	
	(c) Explain Flame Spray Pyrolysis technique for nanomaterials	07
Q.3	(a) Classify Nano Coatings.	03
	(b) State and explain the different coating defects.	04
	(c) Explain Scanning Electron Microscope (SEM).	07
	OR	
Q.3	(a) What do you mean by surface engineering?	03
	(b) Describe Atomic Force Microscopy.	04
	(c) Explain transmission electron microscopy (TEM).	07
Q.4	(a) Classify methods for synthesis of nano materials.	03
	(b) Describe the applications of coatings.	04
	(c) Explain UV visible spectroscopy in detail.	07
	OR	
Q.4	(a) Discuss top down and bottom-up approach.	03
	(b) Describe different properties required for coating.	04
	(c) Explain Surface preparation by electrochemical method.	07
Q.5	(a) Why Surface modification is required?	03
	(b) Which are the important properties of IVD coating?	04
	(c) Describe surface modification by Ion Implantation	07
	OR	
Q.5	(a) Enlist different methods for surface modification.	03
	(b) Explain one case study based on Nano coating of engineering component.	04
	(c) Describe surface modification by Plasma	07