

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VII EXAMINATION – SUMMER 2026

Subject Code:3171931

Date:05-06-2026

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) Define Nanotechnology. Also, give its applications.	03
	(b) Explain in brief the different classes of nanomaterials.	04
	(c) Explain engineering applications of nanoscience and nanotechnology in the field of cosmetics and consumer goods industry.	07
Q.2	(a) Classify various nano-synthesis methods.	03
	(b) Distinguish between Top-down and Bottom-up approach of nanomaterial synthesis.	04
	(c) Explain synthesis by vapor condensation methods.	07
	OR	
	(c) Explain DC and RF sputtering method.	07
Q.3	(a) State applications, advantages, and disadvantages of XRD.	03
	(b) Explain Bragg's equation.	04
	(c) Explain transmission electron microscopy (TEM). Also, give its applications.	07
	OR	
Q.3	(a) What are the different tools to characterize nanomaterials?	03
	(b) Distinguish between SEM and TEM	04
	(c) Explain Atomic force microscopy. Also, give its applications.	07
Q.4	(a) What do you mean by surface engineering?	03
	(b) Illustrate with a neat sketch electroplating process.	04
	(c) Explain the Sand blasting method used for surface preparation.	07
	OR	
Q.4	(a) Enlist different methods for surface modification.	03
	(b) Illustrate with a neat sketch galvanizing process.	04
	(c) Explain the Shot peening process with a neat sketch.	07
Q.5	(a) What are the important properties of IVD coatings?	03
	(b) Give a classification of different CVD processes.	04
	(c) What is IVD? Explain the working principle of IVD with a neat sketch.	07
	OR	
Q.5	(a) What is ion implantation? Also, give its applications.	03
	(b) Explain the steps to be followed for the IVD aluminium process.	04
	(c) Explain surface modification by friction stir processing.	07
