

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3171931****Date:07-01-2023****Subject Name:Nanotechnology and surface Engineering****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) Briefly explain different classes of nano materials.	03
	(b) Discuss the role of nano size particles on various properties of material.	04
	(c) Justify the importance of nano science in present and discuss the challenges in applicability of nano technology.	07
Q.2	(a) Explain Bragg's law.	03
	(b) Differentiate top-down and bottom-up approach of synthesis.	04
	(c) Enlist different tools used in characterization of nanomaterials. Briefly explain XRD with its advantages and applications.	07
	OR	
	(c) Explain scanning electron microscopy (SEM) in detail.	07
Q.3	(a) What is atomic force microscopy?	03
	(b) Explain various types of nano coatings and its applications.	04
	(c) Briefly explain vapor condensation methods.	07
	OR	
Q.3	(a) Explain sand blasting method used for surface preparation.	03
	(b) Compare laser method and spray pyrolysis.	04
	(c) Explain transmission electron microscopy (TEM)	07
Q.4	(a) What is nano coating?	03
	(b) State and explain the different coating defects.	04
	(c) Explain shot blasting process with neat sketch.	07
	OR	
Q.4	(a) What do you mean by surface engineering?	03
	(b) Compare the aluminum coating and cadmium plating.	04
	(c) Explain UV visible spectroscopy in detail.	07
Q.5	(a) Enlist different methods for surface modification.	03
	(b) Which are the important properties of IVD coating?	04
	(c) Briefly explain surface modification by friction stir processing.	07
	OR	
Q.5	(a) Discuss the importance of surface composite in engineering application.	03
	(b) Explain vapor phase degreasing method used for surface preparation.	04
	(c) Briefly explain electron beam lithography.	07
