

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VIII (NEW) EXAMINATION – WINTER 2017****Subject Code: 2182114****Date: 15/11/2017****Subject Name: Thin Film and Nano-Technology (Department Elective - III)****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.

			MARKS
Q.1	(a)	Explain that why materials behave so differently at nanoscale?	03
	(b)	Describe applications of nanotechnology.	04
	(c)	What is carbon nanotube? Write a note on carbon nanotubes.	07
Q.2	(a)	What is physical vapour deposition technique for nano-material production? Give the advantages of this method.	03
	(b)	Describe the effect of grain size on mechanical properties of nano structured materials.	04
	(c)	Explain the sol-gel technique for nano-material production. Give advantages of this method.	07
		OR	
	(c)	Describe the sputtering method for nanomaterial Preparation.	07
Q.3	(a)	Explain how Multicomponent deposition is carried out in PVD.	03
	(b)	What is vapor deposition? Justify role of vacuum in vapor deposition.	04
	(c)	Explain sputtering method of Physical vapour Deposition. Give Mechanism of Sputtering.	07
		OR	
Q.3	(a)	Describe sputtering yield.	03
	(b)	What is chemical vapour Deposition? Write function and name of carrier gas in CVD.	04
	(c)	Describe the Plasma Enhanced chemical vapor deposition (PECVD) Method of thin film preparation.	07
Q.4	(a)	Describe the difference in thick film and thin film.	03
	(b)	Describe the novel properties of thin films.	04
	(c)	Explain the nucleation and growth mechanism of thin films.	07
		OR	
Q.4	(a)	Describe the term nanocrystals....	03
	(b)	Explain how condensation is useful in thin film preparation.	04
	(c)	What do you mean by thin film? Explain the method used to measure thin film thickness.	07
Q.5	(a)	Give the examples & applications of Nanomaterials used as Cosmetic products.	03
	(b)	Give a detailed classification of Nano materials with examples of each.	04
	(c)	Describe the Gas Condensation Technique for Ultrafine Nano Particle production.	07
		OR	
Q.5	(a)	Give the factors affecting mechanical alloying technique for nano-material production.	03
	(b)	"Bottom-up technique is more convenient for nano fabrication" justify.	04
	(c)	Describe the plasma deposition process for Nano Particle production.	07



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