

CBCS SCHEME

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BETCK105C

First Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Introduction to Nano Technology

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Explain the confinement of electrons in 0D, 1D , 2D and 3D systems.	8	L2	CO1
	b.	Describe the synthesis of nano particles by Sol – gel method.	8	L2	CO1
	c.	Write a note on Laser Ablation.	4	L1	CO1
OR					
Q.2	a.	With a neat sketch, explain the chemical bath deposition techniques for the synthesis of nanomaterials.	10	L2	CO1
	b.	Describe the process of Ball milling method of producing nanomaterials.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the principle of working of SEM.	10	L3	CO2
	b.	Write a note on AFM.	5	L1	CO2
	c.	In a X – ray diffraction experiment , peak width at half maximum is 0.6° and its corresponding Bragg's angle is 24° . Calculate the crystalline size using Debye – Scherrer equation. Given wavelength used in X – ray diffraction experiment is 1.54 \AA .	5	L3	CO2
OR					
Q.4	a.	Discuss the principle , construction , working of STM.	10	L2	CO2
	b.	Mention the differences between SEM , TEM and AFM.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the structure , synthesis , properties and applications of fullerene.	10	L2	CO3
	b.	What is CNT? Mention the types of methods of synthesis of CNTs. Discuss any one of the methods with neat diagram.	10	L2	CO3
OR					
Q.6	a.	Describe the electrical , electronics and mechanical properties of graphene.	6	L2	CO3
	b.	Write a note on : i) Carbon nanofibers ii) Nanodiamonds.	8	L2	CO3
	c.	Mention any four applications of Graphene.	6	L1	CO3

Module – 4					
Q.7	a.	Define Solar cells. Explain in brief the different generation of solar cells.	8	L2	CO4
	b.	Describe the construction and working of Quantum dot sensitized solar cells.	8	L2	CO4
	c.	Mention any four basic requirements of a good anodic materials.	4	L1	CO4
OR					
Q.8	a.	Explain the construction and working of Lithium – ion Battery.	8	L2	CO4
	b.	Describe the construction and working of fuel cell with a relevant diagram.	8	L2	CO4
	c.	Mention the limitations of graphite anodes.	4	L1	CO4
Module – 5					
Q.9	a.	Describe the applications of nanotechnology in medicine and health care.	8	L2	CO5
	b.	Explain any four applications of nanotechnology in agriculture and food industry.	8	L2	CO5
	c.	Write a note on Nanoelectronics.	4	L1	CO5
OR					
Q.10	a.	Describe the applications of nanotechnology in : i) Nanocomputers ii) Chemical industry iii) Nano photonics.	9	L2	CO5
	b.	List the major breakthrough in Nanotechnology.	6	L2	CO5
	c.	Explain the applications of Nanobiotechnology.	5	L2	CO5
