

CBCS SCHEME

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BETCK105C/ BETCKC105

First Semester B.E./B.Tech. Degree Supplementary Examination,
June/July 2024

Introduction to Nanotechnology

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 Synthesis of Silica (SiO ₂) nano particle using sol-gel method.	8	L2	CO1
	b.	Explain the synthesis of CdS thin film using SILAR and chemical bath deposition method.	8	L2	CO1
	c.	What is SAVR? Calculate the SAVR for a spherical particle of radius 3 nm.	4	L3	CO1
OR					
Q.2	a.	Explain the synthesis of ZnO nano particle using solution combustion method.	8	L2	CO1
	b.	With the help of neat diagram, explain the synthesis of nano particle using Ball milling technique. Mention any two advantages.	8	L2	CO1
	c.	Explain the synthesis of nano film using sputtering method.	4	L2	CO1
Module – 2					
Q.3	a.	With the aid of labeled diagram, explain the construction, working and any one mode of operation of STM.	8	L2	CO2
	b.	Explain the construction and working of UV-Visible spectrometer.	8	L2	CO2
	c.	In an X-ray diffraction experiment the Bragg angle (θ) was measured to be 32.5° and the full width at half maxima is 2.5°. Calculate the crystallite size assuming X-ray wavelength as 1.54 Å and K = 0.94.	4	L3	CO2
OR					
Q.4	a.	Explain the construction and working of scanning electron microscope.	8	L2	CO2
	b.	Explain the construction, working and any one mode of operation of Atomic Force Microscope (AFM).	8	L2	CO2
	c.	Derive Scherrer equation.	4	L3	CO2
Module – 3					
Q.5	a.	Explain the synthesis of graphene using chemical vapour deposition method. Mention any three properties of Graphene.	8	L2	CO3

	b.	Explain any one method of synthesis Fullerene. Mention any three applications of fullerenes.	8	L2	CO3
	c.	Write a note on Carbon nanofiber.	4	L2	CO3
OR					
Q.6	a.	Explain the synthesis of SWCNT and MWCNT using CVD method.	8	L2	CO3
	b.	Write a note on, (i) Carbon Nano Composites. (ii) Carbon nano disc	8	L2	CO3
	c.	Mention any four applications of carbon nano tubes.	4	L1	CO3
Module – 4					
Q.7	a.	With the help of energy level diagram, explain the construction and working of Dye sensitized solar cell.	8	L2	CO4
	b.	Explain the construction and working of Li-ion battery.	8	L2	CO4
	c.	Mention any four disadvantages of graphite as Anode material in Lithium-ion battery.	4	L1	CO4
OR					
Q.8	a.	Explain the construction and working of Quantum dot sensitized solar cell.	8	L2	CO4
	b.	Explain the construction and working of fuel cell.	8	L2	CO4
	c.	Explain in brief different generation of solar cell.	4	L1	CO4
Module – 5					
Q.9	a.	Explain the role of nano materials in, (i) Agriculture (ii) Food preservation	8	L3	CO5
	b.	Explain any two application of nano materials in, (i) Drug delivery (ii) Diagnosis	8	L3	CO5
	c.	Define the terms : (i) Nano chemistry (ii) Nano photonics (iii) Nano Biotechnology (iv) Nano computing	4	L1	CO5
OR					
Q.10	a.	Explain any two application of nano materials in, (i) Electronics (ii) Chemistry	8	L2	CO5
	b.	Explain the application of nano materials in, (i) Optics (ii) Computing	8	L3	CO5
	c.	Write a note on Biochemical application of nano materials.	4	L3	CO5
