



CBCS SCHEME

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BETCK205C

Second 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 synthesis of ZnO nanoparticle using solution combustion method.	08	L2	CO1
	b.	Describe the laser ablation technique for the preparation of nanomaterials with diagram. Mention any two advantages.	08	L2	CO2
	c.	Explain the synthesis of nanomaterials by chemical bath deposition method.	04	L2	CO1
OR					
Q.2	a.	With the help of neat diagram explain the synthesis of nanoparticle using Ball milling technique. Mention any two advantages.	08	L2	CO1
	b.	Explain the synthesis of Silica (SiO ₂) nanoparticle using sol-gel method.	08	L2	CO1
	c.	Define surface area to volume ratio. Calculate the SAVR for a spherical particle of radius 6 nm.	04	L3	CO1
Module – 2					
Q.3	a.	Explain the construction and working of transmission electron microscope.	08	L2	CO2
	b.	Explain the construction , working and any one mode of operation of Atomic force microscope.	08	L2	CO2
	c.	Derive Scherrer equation.	04	L3	CO2
OR					
Q.4	a.	Explain the construction and working of UV-visible spectrometer.	08	L2	CO2
	b.	Explain the construction and working of scanning electron microscope.	08	L2	CO2
	c.	In a X-ray diffraction experiment peak width half maxima (FWHM) is 0.8° and its Bragg angle (θ) is 32°. Calculate the crystallite size using Scherrer equation assuming X-ray wavelength 1.54 Å and K = 0.94	04	L3	CO2
Module – 3					
Q.5	a.	Explain the synthesis of SWCNT and MWCNT using CVD method.	08	L2	CO3
	b.	Write a note on : i) Carbon nano composites ii) Nano-diamonds	08	L2	CO3
	c.	Mention any four applications of carbon nanotubes.	04	L1	CO3

OR

Q.6	a.	Explain any one method of synthesis of fullerenes. Mention any three applications of fullerenes.	08	L2	CO3
	b.	Explain the synthesis of graphene by chemical vapour deposition. Explain any one of the properties of graphene. Mention its applications.	08	L2	CO3
	c.	Write a note on Carbon nanofibers.	04	L2	CO3

Module – 4

Q.7	a.	Describe the construction and working of Quantum dot solar cells.	08	L2	CO4
	b.	Define solar cells. Describe briefly 1 st , 2 nd and 3 rd generations of solar cells.	08	L2	CO4
	c.	Mention any four disadvantages of graphite as Anode material in Lithium-ion battery.	04	L1	CO4

OR

Q.8	a.	Explain the construction and working of Li-ion battery.	08	L2	CO4
	b.	Explain the construction and working of fuel cell.	08	L2	CO4
	c.	Show the construction of Dye sensitized solar cell with the help of energy level diagram.	04	L1	CO4

Module – 5

Q.9	a.	Explain the application of nanotechnology in agricultural and food field.	08	L3	CO5
	b.	Explain the applications of nanotechnology in electronics and memory devices.	08	L3	CO5
	c.	Define the following terms: i) Nanobiotechnology ii) Nanophotonics iii) Nano biotechnology iv) Nanocomputing	04	L1	CO5

OR

Q.10	a.	Explain any two application of nanotechnology in drug delivery and diagnosis.	08	L2	CO5
	b.	Explain the applications of nanotechnology in optics and computing.	08	L3	CO5
	c.	Write a note on biochemical application of nanomaterials.	04	L3	CO5
