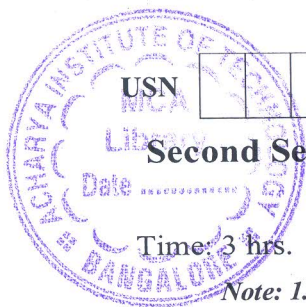


# CBCS SCHEME



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BETCK205C/BETCKC205

**Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024**

## 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 nanomaterial using solution combustion method.	8	L2	CO1
	b.	Exemplify the thin film synthesis using chemical bath deposition and SILAR method.	8	L3	CO1
	c.	Discuss the precipitation method of synthesis of Nanoparticle.	4	L2	CO1
<b>OR</b>					
Q.2	a.	Discuss the construction and working of Ball milling method of preparing nano-material. Mention any two advantages of Ball milling technique.	8	L2	CO1
	b.	Explain the different steps involved in the synthesis of nano-particles of silica using Sol-Gel method.	8	L2	CO1
	c.	Write a note on solution combustion synthesis.	4	L2	CO1
<b>Module – 2</b>					
Q.3	a.	Discuss the construction and working of TEM.	8	L2	CO2
	b.	Discuss the principle, construction, working and different modes of operations of STM.	8	L2	CO2
	c.	Derive Debye-Scherrer equation.	4	L3	CO2
<b>OR</b>					
Q.4	a.	Discuss the working and instrumentation of UV-visible spectroscopy. Explain how one can determine bandgap of material from UV-visible data.	8	L2	CO2
	b.	Explain with suitable diagram the construction and working of SEM.	8	L2	CO2
	c.	The X-ray undergoes diffraction from a crystallite plane at an angle ( $\theta$ ) of $30^\circ$ . Full width at half maximum is measured to be $0.5^\circ$ . Calculate the crystallite size assuming wavelength of X-ray as $1.54\text{\AA}$ and the Scherrer constant as unity.	4	L3	CO2
<b>Module – 3</b>					
Q.5	a.	Explain structure, synthesis, properties and application of Fullerene.	10	L2	CO3
	b.	Discuss the application of Graphene.	6	L2	CO3
	c.	Write a note on nano diamond.	4	L2	CO3

OR					
Q.6	a.	What is CNT? Discuss any one of the method of synthesis of CNT with neat diagram of experimental set up.	8	L2	CO3
	b.	Discuss the synthesis of Graphene by chemical vapour deposition and explain any three properties of Graphene.	8	L2	CO3
	c.	Write a note on Carbon nano composites.	4	L2	CO3
Module – 4					
Q.7	a.	What is Solar cell? Explain in brief the different generation of solar cells.	8	L2	CO4
	b.	Explain the construction and working of Fuel cell.	8	L2	CO4
	c.	Mention any four disadvantages of graphite anode.	4	L2	CO4
OR					
Q.8	a.	Describe the construction and working of Dye-sensitized solar cells.	8	L2	CO4
	b.	Explain the construction and working of Lithium-ion battery.	8	L2	CO4
	c.	Mention any Four basic requirement of a good cathode material.	4	L1	CO4
Module – 5					
Q.9	a.	Explain the application of nanotechnology in drug delivery and diagnostics.	8	L2	CO5
	b.	Explain the applications of nanotechnology in optics.	8	L2	CO5
	c.	Write a note on nano computing.	4	L2	CO5
OR					
Q.10	a.	Describe the application of Nanotechnology in i) detection of heart attack ii) 3D – printed battery iii) Contact lenses.	6	L2	CO5
	b.	Explain any four applications of nanotechnology in agriculture and food industry.	8	L2	CO5
	c.	Write a note on : i) Nano fertilizer ii) Nano electronics.	6	L2	CO5

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