

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

QUESTION BANK



VII SEMESTER

1920001 – FUNDAMENTALS OF NANOSCIENCE

Regulation – 2019

Academic Year 2025 – 2026 ODD

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SUBJECT : 1920001 - FUNDAMENTALS OF NANO SCIENCE
SEM / YEAR : VII / IV

UNIT I - INTRODUCTION

Nano scale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering- Classifications of nanostructured materials- Nano particles- quantum dots, nanowires-ultra-thin films multi-layered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

PART - A

S.No	Questions	CO's	BT Level	Competence
1.	Name any four types of nanostructured materials.	CO1	BTL 1	Remember
2.	What do you mean by NANO?	CO1	BTL 2	Understand
3.	List the application of quantum dots.	CO1	BTL 1	Remember
4.	Define nanomaterials.	CO1	BTL 1	Remember
5.	What do you mean by nanoparticles?	CO1	BTL 2	Understand
6.	Define Nanoscience and Nanotechnology.	CO1	BTL 1	Remember
7.	What are one dimensional nanomaterial?	CO1	BTL 2	Understand
8.	Give the applications of nanowires.	CO1	BTL 2	Understand
9.	How does the mechanical property of material vary in nano regime?	CO1	BTL 2	Understand
10.	What do you mean by nanowires?	CO1	BTL 2	Understand
11.	Define Quantum dots.	CO1	BTL 1	Remember
12.	Why do nano particles exhibit a low melting point when compared to the respective bulk materials?	CO1	BTL 2	Understand
13.	Write any four properties of nanowires.	CO1	BTL 2	Understand
14.	Identify any three applications of thin films.	CO1	BTL 1	Remember
15.	Demonstrate any four day to day live commercial applications of nanotechnology.	CO1	BTL 1	Remember
16.	Nano particle of gold is purple in colour. Justify.	CO1	BTL 2	Understand
17.	What is meant by multi layered materials?	CO1	BTL 1	Remember
18.	How does the optical property of material vary in nano regime?	CO1	BTL 2	Understand
19.	Generalize the effects of length scale of nanomaterials on magnetic properties.	CO1	BTL 2	Understand
20.	Why do nano particles exhibit a low melting point when compared to the respective bulk materials?	CO1	BTL 1	Remember
21.	Classify the nano structured materials.	CO1	BTL 2	Understand
22.	Examine about the types of nano wires.	CO1	BTL 2	Understand
23.	Analyze the various conditions involved in synthesis of Nano Wires.	CO1	BTL 2	Understand
24.	Express 5nm in terms of equivalent μm	CO1	BTL 1	Remember

PART B

1.	Describe about the implications of Nano science in the field of (i) Physics (7) (ii) Chemistry. (6)	CO1	BTL 3	Apply
2.	Describe the effects of nanotization on the properties of materials. (13)	CO1	BTL 3	Apply

3.	Distinguish the properties and synthesis methods of Nano particles and Quantum dots. (13)	CO1	BTL 4	Analyze
4.	Describe about the implications of Nano science and technology for (i) Biology (7) (ii) Engineering. (6)	CO1	BTL 3	Apply
5.	Discuss in detail about the following properties of Nano particles. (i) Mechanical (7) (ii) Electronics. (6)	CO1	BTL 4	Analyze
6.	Generalize the effects of length scales involved and effect on properties in nanoparticles. (13)	CO1	BTL 5	Evaluate
7.	(i) Analyze term Nano phase materials. (3) (ii) Explain how the physical properties vary with geometry. (10)	CO1	BTL 4	Analyze
8.	Discuss in detail about the Optical and Thermal properties of Nano particles (13)	CO1	BTL 4	Analyze
9.	Explain the properties, synthesis methods and applications of (i) Ultra-thin films and (7) (ii) Multi-layered materials. (6)	CO1	BTL 5	Evaluate
10.	Describe the plasma arcing method of producing Nano Particles. (13)	CO1	BTL 3	Apply
11.	List applications of Nano materials in various Fields. Also explain the method of producing Nano materials using physical vapour deposition techniques. (13)	CO1	BTL 5	Evaluate
12.	List the factors responsible for change of properties of nano scale material from that of the bulk material. (13)	CO1	BTL 3	Apply
13.	Explain the different ways of classifying nanomaterials with examples. (13)	CO1	BTL 3	Apply
14.	Explain with necessary diagrams the synthesis of nanomaterials using Chemical Vapour deposition. (13)	CO1	BTL 4	Analyze
15.	Summarize the steps involved in synthesis of nanomaterials using Sol-gel method. (13)	CO1	BTL 4	Analyze
16.	Discuss about the properties involved in nanoparticles. (13)	CO1	BTL 5	Evaluate
17.	With a neat Sketch, Explain the synthesis of Nano wires. (13)	CO1	BTL 5	Evaluate

PART C

1.	Discuss about nanomaterials in science and engineering fields. (15)	CO1	BTL 6	Create
2.	Elaborate present and future applications of nano particles in industry. (15)	CO1	BTL 6	Create
3.	Discuss about the classification of nanostructured materials with suitable examples. (15)	CO1	BTL 5	Evaluate
4.	Why surface area/volume ratio is very large for nano particles compared to bulk materials? Highlight the effect of surface area increase on mechanical and optical properties. (15)	CO1	BTL 5	Evaluate
5.	Does the material change its properties at nano scale compared to their bulk material?.Elaborate it (15)	CO1	BTL 5	Evaluate

UNIT II - GENERAL METHODS OF PREPARATION

Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultra sonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE

PART - A

S.No	Questions	CO's	BT Level	Competence
1.	Differentiate bottom-up and Top-down approach.	CO2	BTL 2	Understand
2.	Point out the advantages of top-down approach.	CO2	BTL2	Understand
3.	Analyse self-assembly of nanostructures.	CO2	BTL 2	Understand
4.	State the principle of bottom-up approach with an example.	CO2	BTL 1	Remember
5.	Generalize the application of self-assembly materials.	CO2	BTL 2	Understand
6.	What do you mean by Ultra sonication?	CO2	BTL 2	Understand
7.	List any four day to day live commercial applications of nanotechnology.	CO2	BTL 1	Remember
8.	When does contamination arise in Attritor milling?	CO2	BTL 1	Remember
9.	Identify the category to which sol-gel, MBE, ECAP and laser ablation belong to.	CO2	BTL 2	Understand
10.	Classify the vapour phase deposition methods.	CO2	BTL 2	Understand
11.	What do you mean by colloidal routes?	CO2	BTL 2	Understand
12.	Classifying the types of Sputtering.	CO2	BTL 2	Understand
13.	What is the principle of mechanical milling?	CO2	BTL 1	Remember
14.	Why bottom-up approaches will be preferred for nano material fabrication?	CO2	BTL 2	Understand
15.	List the applications of milling.	CO2	BTL 1	Remember
16.	Compare the term MBE and MOMBE.	CO2	BTL 1	Remember
17.	Classify the different types of milling.	CO2	BTL 2	Understand
18.	Illustrate the principle of atomic layer Epitaxy.	CO2	BTL 2	Understand
19.	What is meant by co-precipitation?	CO2	BTL 2	Understand
20.	Define sputtering.	CO2	BTL 1	Remember
21.	Write the advantages and disadvantages of MOCVD.	CO2	BTL 2	Understand
22.	Write the advantages of CVD method?	CO2	BTL 2	Understand
23.	Analyze which method of process mostly used for synthesis of nano materials.	CO2	BTL 2	Understand
24.	No safety precautions are needed for MBE process. Justify.	CO2	BTL 1	Remember

PART B

1.	Explain in detail about the working of mechanical milling process and mention its merits and demerits.(13)	CO2	BTL 4	Analyze
2.	Discuss the working of molecular beam epitaxy for producing nano materials. (13)	CO2	BTL 3	Apply
3.	(i)Differentiate PVD and CVD. (3) (ii)Write notes on Sputtering and mention its advantages and drawbacks. (10)	CO2	BTL 4	Analyze
4.	Discuss in detail about Atomic Layer Epitaxy in detail. (13)	CO2	BTL 3	Apply
5.	Explain any two methods of chemical synthesis of (i) Nanomaterials. (8) (ii) List their advantages and disadvantages. (5)	CO2	BTL 3	Apply

6.	Enumerate the different chemical methods of synthesis of nanomaterials and state its advantages and disadvantages. (13)	CO2	BTL 3	Apply
7.	Explain the working of MOCVD in detail. (13)	CO2	BTL 4	Analyze
8.	Explain the working of e-beam evaporation with neat sketch. (13)	CO2	BTL 5	Evaluate
9.	Illustrate the scheme of the formation of agglomerates from colloidal sols and structural model of Nanomer of inorganic & organic Nanocomposite. (13)	CO2	BTL 3	Apply
10.	(i) Generalize the schematic representation of electron beam deposition system. (7) (ii) Create the difference between gas condensation process and vapour condensation process employed for synthesis of Nano powders. (6)	CO2	BTL 5	Evaluate
11.	Illustrate in detail about Ultrasonication process. (13)	CO2	BTL 3	Apply
12.	Define colloidal routes. Describe in detail about fabrication nanoparticles by simple colloidal process. (13)	CO2	BTL 3	Apply
13.	Describe about top down approach in synthesis of nano materials. (13)	CO2	BTL 3	Apply
14.	Discuss about the following methods with schematic diagram of (i) RF sputtering. (7) (ii) Reactive sputtering. (6)	CO2	BTL 4	Analyze
15.	With a neat schematic explain in detail about chemical vapour deposition technique. Also mention its advantages and disadvantages. (13)	CO2	BTL 4	Analyze
16.	Describe in detail about strategies involved in the synthesis of self-assembly. (13)	CO2	BTL 3	Apply
17.	Describe the MBE growth technique with a sketch. (13)	CO2	BTL 4	Analyze
PART C				
1.	Explain about thermal evaporation in general methods of preparation of nano materials. (15)	CO2	BTL 5	Evaluate
2.	Explain the working of MOMBE process with neat sketch. (15)	CO2	BTL 6	Create
3.	Discuss the role of bottom-up approach in nano technology. (15)	CO2	BTL 6	Create
4.	Explain the applications of nano powders in industry. (15)	CO2	BTL 5	Evaluate
5.	Explain the bottom –up approach towards synthesis of Nano structured materials. Discuss in detail about any two methods. (15)	CO2	BTL 5	Evaluate

UNIT III - NANOMATERIALS

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications- Nano metal oxides- ZnO, TiO₂, MgO, ZrO₂, NiO, nanoalumina, CaO, AgTiO₂, Ferrites, Nanoclays functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

PART – A

S.No	Questions	CO's	BT Level	Competence
1.	Define fullerene.	CO3	BTL 1	Remember
2.	How are carbon nanotubes classified?	CO3	BTL 2	Understand
3.	What are the methods adopted for producing nano materials?	CO3	BTL 1	Remember
4.	List any four properties of Carbon nanotubes.	CO3	BTL 1	Remember
5.	Define graphene.	CO3	BTL 1	Remember
6.	Differentiate single wall and multi wall carbon nanotubes.	CO3	BTL 2	Understand
7.	Differentiate carbon nanotubes from bucky balls.	CO3	BTL 1	Remember
8.	Give the features of Nano metal oxides.	CO3	BTL 2	Understand
9.	Illustrate the principle of plasma CVD involved in Nano materials.	CO3	BTL 1	Remember
10.	What do you mean by CVD routes in nanotubes?	CO3	BTL 1	Remember
11.	Which methods involved producing Tio ₂ nanoparticles?	CO3	BTL 2	Understand
12.	Give a brief note on the applications of laser ablation.	CO3	BTL 1	Remember
13.	Illustrate the features of CaO Nano materials	CO3	BTL 2	Understand
14.	Define ferrites.	CO3	BTL 1	Remember
15.	State the applications of ferrites.	CO3	BTL 1	Remember
16.	It is desired to synthesize titania nanoparticles of about 2-3 nm in size. Which technique would you choose and also give reason for it.	CO3	BTL 2	Understand
17.	What do you mean by nanoalumina metal oxides?	CO3	BTL 2	Understand
18.	Nano-gold no longer glitters with a golden yellow metallic luster. Why?	CO3	BTL 1	Remember
19.	Give a brief note on applications of nanoclays.	CO3	BTL 2	Understand
20.	Distinguish between Quantum wires and Quantum dots.	CO3	BTL 2	Understand
21.	Give a brief note on Carbon nanotube.	CO3	BTL 1	Remember
22.	Draw the schematic of Carbon Arc method.	CO3	BTL 2	Understand
23.	What do you understand by Nanoclays?	CO3	BTL 1	Remember
24.	Write a note on Buckminster fullerenes.	CO3	BTL 1	Remember

PART – B

1.	Explain three different structure of SWCNT and different types of defect in it. (13)	CO3	BTL 3	Apply
2.	Discuss in detail about quantum wires - its preparation, properties and applications. (13)	CO3	BTL 4	Analyze
3.	(i) Discuss about the synthesis of CaO in brief. (7) (ii) Write short note on Buckminster fullerene. (6)	CO3	BTL 3	Apply
4.	Describe the principle and different methods of synthesis in nanoparticles. (13)	CO3	BTL 3	Apply
5.	Explain the synthesis of the following in brief: a) NiO. (7) b) AgTiO ₂ . (6)	CO3	BTL 5	Evaluate
6.	Explain in detail about Arc growth method.	CO3	BTL 3	Apply

	(13)			
7.	Give a detailed account of the nano forms of Carbon. (13)	CO3	BTL 4	Analyze
8.	Discuss about the synthesis of ZrO ₂ in brief. (13)	CO3	BTL 4	Analyze
9.	Discuss in detail about quantum dots - its preparation, properties and applications. (13)	CO3	BTL 4	Analyze
10.	Explain the structure-property relationship of nanometal oxides with an example. (13)	CO3	BTL 4	Analyze
11.	Describe the different types of ferrite structure with suitable diagrams. (13)	CO3	BTL 3	Apply
12.	Illustrate the structure-property relationship of nanoalumina with an example. (13)	CO3	BTL 3	Apply
13.	Describe preparation, properties and applications of nanoclays. (13)	CO3	BTL 4	Analyze
14.	Explain about a) CVD routes. (7) b) Plasma CVD. (6)	CO3	BTL 5	Evaluate
15.	Discuss about the synthesis of MnO in brief. (13)	CO3	BTL 3	Apply
16.	Illustrate about Carbon Nanotube fabrication using Laser ablation technique. (13)	CO3	BTL 3	Apply
17.	Explain in detail any two methods of Nano metal oxides. (13)	CO3	BTL 4	Analyze

PART C

1.	Explain the purification of Indian clay in detail. (15)	CO3	BTL 5	Evaluate
2.	Discuss about the synthesis of ZnO in brief. (15)	CO3	BTL 6	Create
3.	Discuss about the synthesis of TiO ₂ with a block diagram. (15)	CO3	BTL 6	Create
4.	Explain different fabrication methods for carbon nanotubes. (15)	CO3	BTL 5	Evaluate
5.	In detail discuss the structure-property relationship of nanometal oxides with an example. (15)	CO3	BTL 6	Create

UNIT IV- CHARACTERIZATION TECHNIQUES

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nano indentation

PART – A

S.No	Questions	CO's	BT Level	Competence
1.	What is X-ray diffraction (XRD)?	CO4	BTL-1	Remember
2.	State Bragg's Law.	CO4	BTL-1	Remember
3.	List the applications of XRD in nanomaterials.	CO4	BTL-2	Understand
4.	What is meant by crystal structure identification in XRD?	CO4	BTL-2	Understand
5.	Define Scanning Electron Microscopy (SEM).	CO4	BTL-1	Remember
6.	What is the principle of SEM?	CO4	BTL-2	Understand
7.	Mention any two advantages of Environmental SEM over conventional SEM.	CO4	BTL-2	Understand
8.	What is meant by backscattered electrons in SEM?	CO4	BTL-1	Remember
9.	Define Transmission Electron Microscopy (TEM).	CO4	BTL-1	Remember
10.	Differentiate between SEM and TEM.	CO4	BTL-2	Understand
11.	What is the significance of high-resolution TEM?	CO4	BTL-2	Understand
12.	Mention any two limitations of TEM.	CO4	BTL-2	Understand

13.	What is Atomic Force Microscopy (AFM)?	CO4	BTL-1	Remember
14.	Name the basic modes of AFM operation.	CO4	BTL-1	Remember
15.	What is Scanning Probe Microscopy (SPM)?	CO4	BTL-1	Remember
16.	Define Scanning Tunneling Microscopy (STM).	CO4	BTL-1	Remember
17.	What is the working principle of STM?	CO4	BTL-2	Understand
18.	What is SNOM and where is it used?	CO4	BTL-1	Remember
19.	Define Electron Spectroscopy for Chemical Analysis (ESCA).	CO4	BTL-1	Remember
20.	What is the principle behind ESCA?	CO4	BTL-2	Understand
21.	What is Secondary Ion Mass Spectrometry (SIMS)?	CO4	BTL-1	Remember
22.	List two advantages of SIMS in surface analysis.	CO4	BTL-2	Understand
23.	Define nano-indentation.	CO4	BTL-1	Remember
24.	What are the key parameters measured in nano-indentation tests?	CO4	BTL-2	Understand

PART B

1.	Explain the principle and working of X-ray diffraction. How is Bragg's law applied to determine crystal structure? (13)	CO4	BTL-4	Analyze
2.	Describe the procedure and applications of powder XRD technique for nanomaterial characterization. (13)	CO4	BTL-3	Apply
3.	Compare and contrast the operational features and applications of SEM and TEM. (13)	CO4	BTL-4	Analyze
4.	With a neat sketch, explain the construction, working, and applications of Scanning Electron Microscope (SEM). (13)	CO4	BTL-4	Analyze
5.	What is Environmental SEM? Discuss its advantages and applications over conventional SEM. (13)	CO4	BTL-4	Analyze
6.	Describe the working principle and image formation in Transmission Electron Microscopy (TEM). (13)	CO4	BTL-3	Apply
7.	Explain high-resolution imaging in TEM. How is it useful in nanoscale analysis? (13)	CO4	BTL-4	Analyze
8.	Explain the modes of operation and surface characterization capabilities of Atomic Force Microscopy (AFM). (13)	CO4	BTL-4	Analyze
9.	What is Scanning Probe Microscopy (SPM)? Discuss its components and compare with SEM. (13)	CO4	BTL-4	Analyze
10.	Describe the principle and working of Scanning Tunneling Microscope (STM) with applications. (13)	CO4	BTL-4	Analyze
11.	Explain the principle of SNOM and its advantages in optical resolution below the diffraction limit. (13)	CO4	BTL-3	Apply
12.	How is Electron Spectroscopy for Chemical Analysis (ESCA) performed? Discuss its use in surface chemistry analysis. (13)	CO4	BTL-4	Analyze
13.	Explain the process of Secondary Ion Mass Spectrometry (SIMS) and discuss how it is used for surface composition analysis. (13)	CO4	BTL-4	Analyze
14.	What is nano-indentation? Describe the technique and explain how hardness and elastic modulus are determined. (13)	CO4	BTL-4	Analyze
15.	Compare AFM, STM, and SNOM in terms of resolution, principle, and application. (13)	CO4	BTL-5	Evaluate
16.	Discuss how surface analysis techniques help in the characterization of nanomaterials. Provide examples. (13)	CO4	BTL-4	Analyze
17.	Illustrate the significance of combining multiple characterization techniques (like XRD, SEM, TEM, AFM) for nanostructure evaluation. (13)	CO4	BTL-5	Evaluate

PART C

1.	Explain the same preparation and the use of TEM in the characterization of nanomaterials. (15)	CO4	BTL 6	Create
2.	Explain high resolution of transmission electron microscopy with schematic diagram. (15)	CO4	BTL 6	Create

3.	Explain an application which uses surface analysis techniques. (15)	CO4	BTL 5	Evaluate
4.	Discuss the importance of electron microscopy in characterization of nano materials in brief. (15)	CO4	BTL 6	Create
5.	Brief about Nano indentation and explain its application in any one field. (15)	CO4	BTL 5	Evaluate

UNIT V- APPLICATIONS

Nano InfoTech: Information storage- Nano computer, molecular switch, super chip, Nano crystal, Nano biotechnology: Nano probes in medical diagnostics and biotechnology, Nano medicines, Targeted drug delivery, Bio imaging - Micro Electro Mechanical Systems (MEMS), Nano Electro Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sun barrier products - In Photostat, printing, solar cell, battery

PART – A

S.No	Questions	CO's	BT Level	Competence
1.	How Nano science is used for information storage?	CO5	BTL 2	Understand
2.	What is Nano computer?	CO5	BTL 2	Understand
3.	Analyze the role of nanotechnology in targeted drug delivery.	CO5	BTL 2	Understand
4.	What is super chip?	CO5	BTL 1	Remember
5.	Define nano crystal.	CO5	BTL 1	Remember
6.	Analyze the role of nanoparticles in bio imaging.	CO5	BTL 2	Understand
7.	Summarize the advantages of nanoprobe in medical field.	CO5	BTL 2	Understand
8.	What do you mean by targeted drug delivery?	CO5	BTL 1	Remember
9.	Define NEMS.	CO5	BTL 1	Remember
10.	Differentiate between MEMS and NEMS.	CO5	BTL 2	Understand
11.	How Nano silver inhibits the bacterial action?	CO5	BTL 2	Understand
12.	List nano based drug delivery vehicles.	CO5	BTL 1	Remember
13.	List the applications of NEMS.	CO5	BTL 1	Remember
14.	What is the role of Nano science in Solar cell?	CO5	BTL 1	Remember
15.	Write the fabrication methods of MEMS.	CO5	BTL 2	Understand
16.	Give any two applications of solar cell.	CO5	BTL 1	Remember
17.	What is solar cell?	CO5	BTL 1	Remember
18.	Compare molecular crystal memory and molecular switch.	CO5	BTL 2	Understand
19.	Define Nano computers.	CO5	BTL 1	Remember
20.	What are nanosensors? Give example.	CO5	BTL 2	Understand
21.	Write the principle of solar cell.	CO5	BTL 2	Understand
22.	Mentions the applications of nano probe.	CO5	BTL 1	Remember
23.	Summarize the need for data storage device.	CO5	BTL 2	Understand
24.	Write about molecular switch.	CO5	BTL 2	Understand

PART B

1.	What is Nano InfoTech and explain in brief with neat sketch. (13)	CO5	BTL 3	Apply
2.	Explain the following terms with neat sketch: (i) Nano crystal memory (7) (ii) Molecular switch (6)	CO5	BTL 3	Apply
3.	Give detail about Bio imaging using nano particles with neat sketch. (13)	CO5	BTL 4	Analyze
4.	Discuss various applications of nanosensors in	CO5	BTL 3	Apply

	biotechnology. (13)			
5.	Explain the role of nanoparticles in medical field. (13)	CO5	BTL 4	Analyze
6.	Discuss the role of nanotechnology in the fabrication of sun barrier products and antibacterial products. (13)	CO5	BTL 5	Evaluate
7.	Discuss in detail about MEMS and NEMS and compare it. (13)	CO5	BTL 3	Apply
8.	Explain about the term (i) Nano computer. (7) (ii) Superchip. (6)	CO5	BTL 4	Analyze
9.	Explain the significance of nanobiotechnology? Discuss briefly the use of nanoprobes in medical diagnostics. (13)	CO5	BTL 3	Apply
10.	Explain Nano science in (i) Photostat. (7) (ii) Printing. (6)	CO5	BTL 4	Analyze
11.	(i) How information is stored using Nano techniques. (10) (ii) Why Nanoparticles are selected for Nano medicines. (3)	CO5	BTL 5	Evaluate
12.	Explain the designing and uses of nanosensors with suitable examples. (13)	CO5	BTL 4	Analyze
13.	Discuss the application of nano technology in the field of Solar cells. (13)	CO5	BTL 5	Evaluate
14.	Explain targeted drug delivery with neat sketch. (13)	CO5	BTL 3	Apply
15.	Brief about the Nano medicines and Targeted drug delivery. (13)	CO5	BTL 4	Analyze
16.	Discuss the use of nanoprobes in diagnostic of cancer. (13)	CO5	BTL 5	Evaluate
17.	Elaborate the significance of MEMS with any applications. (13)	CO5	BTL 4	Analyze
PART C				
1.	Give the role of Nano probes in Nano biotechnology. (15)	CO5	BTL 6	Create
2.	Explain how Nano silver crystalline used for Bacterial inhibition. (15)	CO5	BTL 6	Create
3.	Discuss the recent developments in the usage of quantum dots in drug delivery and sensor applications. (15)	CO5	BTL 6	Create
4.	Discuss the applications of nano technology in the field of Sensor. (15)	CO5	BTL 6	Create
5.	Discuss the application of Micro Electro Mechanical Systems (MEMS) of your choice. (15)	CO5	BTL 5	Evaluate