22CH4D3:NANO CHEMISTRY

Course Code	22CH4D3	I A Marks	30
No. of Lecture Hours / Week	4	End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Seminar	-	Exam Hours	03

Course:NANO CHEMISTRY		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the basic concepts of nanochemistry and nano materials.	2,7
2	Understand the basic and advanced concepts of nanochemistry and nano materials	1,2,7
3	Apply the knowledge gained in the field of nanochemistry as and when required.	1, 6
4	Analyse the role of surface characterization methods in the study of nanomaterials and their properties.	1, 7
5	Evaluate the role and signifigance of nanochemistry in various interdisciplinary sciences.	1, 7

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Nano Chemistry.

CO-PO MATRIX								
COURSE CODE 22CH4D3	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
	CO1		H					M
	CO2	M	M					L
	CO3	H					M	
	CO4	H						M
	CO5	H						M

Unit-I

Introduction to Nano chemistry: Definition of terms-nanoscale, nanomaterials, nanoscience, nanotechnology-scale of materials natural and manmade-nanoscience practiced during ancient and modern periods-contributors to the field of Nanochemistry.

Unit-II

Synthesis of Nanomaterials: Top down and bottom- up approaches-synthesis of carbon nanotubes, quantumdots, gold and silver nanoparticles.

Unit-III

Characterization of Nano materials: Electron microscopy techniques-scanning electron microscopy, transmission electron microscopy and atomic force microscopy.

Unit-IV

Application of Nanomaterials: Solar cells-smart materials-molecular electronics-biosensors-drug delivery and therapy-detection of cancerous cells.

Unit-V

NanochemistryinNature: The science behind the nanotechnology in lotuseffect-self-cleaning property of lotus-gecko foot climbing ability of geckos-water strider-anti wetting property of water striders-spider silk mechanical properties of the spidersilk.

Textbooks/ Referencebooks:

1. Nano: The Essentials: Understanding Nanoscience and Nanotechnology, T.Pradeep, McGraw-Hill Professional Publishing,2008.
2. Introduction to Nanoscience, J.Dutta, H.F.Tibbals and G.L.Hornyak, CRCpress, BocaRaton, 2008.

M.Sc. DEGREE EXAMINATION
FOURTH SEMESTER

22CH4D3 :: NANO CHEMISTRY

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions 5X4=20M

1) (a).What is bottom down approach? (CO-2,L-2)

(OR)

(b). Explain the term nanoscale and nano material? (CO-2,L-2)

2) (a).Compare the basic principle involved in SEM &TEM. (CO-4,L-4)

(OR)

(b). Write a short note on natural and man-made nano particles. (CO-4,L-4)

3)(a).Define quantum dots. (CO-1,L-1)

(OR)

(b). List out the various types of techniques used in characterization of nanomaterials. (CO-1,L-1)

4 (a).Enumerate the role of nanomaterials in drug delivery. (CO-3,L-3)

(OR)

(b). Give an account on biosensors. (CO-3,L-3)

5) (a) Explain in short about water strider. (CO-2,L-2)

(OR)

(b) What is gecko foot climbing? (CO-2,L-2)

SECTION – B **(5x10=50M)**

UNIT - I

6) (a)Explain the following terms

(i) Nanoscale (ii) Nanomaterials (iii) Nanoscience (iv) Nanotechnology (CO-2,L-2)

(OR)

(b)Write a note on nanoscience practiced during ancient and modern periods. (CO-2,L-2)

UNIT – II

7 (a)Explain top down and bottom-up approaches for the synthesis of nanotubes. (CO-2,L-2)

(OR)

(b)Write various methods for the synthesis of gold nanoparticles. (CO-2,L-2)

UNIT – III

8) (a) Write the principle and applications of scanning electron microscopy. (CO-3,L-3)

(OR)

(b) Write the principle and applications of atomic force microscopy. (CO-3,L-3)

UNIT – IV

9)(a) Assess the role of nanomaterials in solar cells and smart materials. (CO-5,L-5)

(OR)

(b) Discuss the role of nanomaterials in the detection of cancerous cells. (CO-5,L-5)

UNIT – V

10)(a) State the importance of lotus effect-self-cleaning property of lotus. (CO-4,L-4)

(OR)

(b) Write a note on the importance of spider silk mechanical properties of the spider silk. (CO-4,L-4)

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