

300803(47)

B. E. (Eighth Semester) Examination, 2020

APR-MAY

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(New Scheme)

**(AEI, Bio Tech., Chem., Civil, CSE, Elect., EEE, EI,
ET&T, IT, Mech., Mining, Metallurgy, Mechatronics,
Prod., Automobile Branch)**

NANOTECHNOLOGY

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

***Note : Attempt all question. Part (a) of each question
is compulsory. Attempt any two parts from
(b), (c) & (d).***

Unit-I

1. (a) Define Nanotechnology.

2

300803(47)

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- (b) Explain how size dependent properties of nano structure are affected at the macroscale. 7
- (c) Explain how atom, ions and molecules are important entities while studying about nano structures. 7
- (d) Explain briefly how quantum mechanics and formation of bonds play an important role in defining the behaviour of nanostructures. 7

Unit-II

2. (a) What is Solgel technique of nanomaterial synthesis? 2
- (b) Explain the process of Lithography. Briefly describe how E-beam Lithography and dippen Lithography is carried out? 7
- (c) Explain how self assembly technique is an effective method for nanomaterial fabrication. 7
- (d) Write short notes on : 7
- (i) Molecular synthesis
- (ii) Polymerisation

[3]

Unit-III

3. (a) What are SEM and TEM techniques in nanomaterial characterisation. 2
- (b) Explain the different SPM methods for characterising nanostructures. What are its advantages and limitations? 7
- (c) Explain the basic theory, principles and practices employed in gel electrophoresis. 7
- (d) Explain MALDI ToF mass spectrometry. What are its different processes? Explain its applications. 7

Unit-IV

4. (a) Define Nanophotonics. 2
- (b) Explain with examples how nanomaterials act as adsorbents for water treatment? 7
- (c) Write a brief note on application of nanomaterials in drug delivery systems. 7

- (d) Explain how nanotechnology finds application in food processing and storage. 7

Unit-V

5. (a) What are Carbon Nanotubes? 2
- (b) What are sintered cermics? Explain its uses. 7
- (c) Explain how quantum dots are used as biomarkers and sensors? 7
- (d) Write a short note on application of silver nanoparticles as antistatic conductive coatings. 7