

**M. TECH. (NANO TECHNOLOGY) SEM-I (CBCS – 2015 COURSE) :
WINTER - 2017**

SUBJECT: NANOSCIENCE & NANOTECHNOLOGY

Day: **Monday**
Date: **15/01/2018**

W-2017-2746

Time: **11.00 AM TO 02.00 PM**
Max Marks: 60

N.B. :

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Draw neat and labeled diagrams **WHEREVER** necessary.
 - 4) Answers to both the sections should be written in **SEPARATE** answer books.
 - 5) Assume suitable data if necessary.
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SECTION – I

Q.1 Define Nanotechnology. Give the list of nano material synthesis methods. [10]
Explain any two methods in detail.

OR

Define Nanotechnology. Elaborate the concept of top-down approach for nanoparticle synthesis. Explain it with suitable example.

Q.2 Explain sol-gel and wet chemical methods for the synthesis nano-materials. [10]

OR

Explain the compaction and consolidation synthesis of bulk nanomaterials. Describe the stress-strain characteristics and the particle size distribution of silver nano particle.

Q.3 Explain any two 1D, 2D and 3D nanostructures with respect composition, properties, application and synthesis process. [10]

OR

Explain any three nano-metal and nano-ceramics nanostructure with respect composition, properties, application and synthesis process.

SECTION – II

Q.4 What are the variations in Band-Gap Energies with length scale? Discuss [10]
any two nano materials for its Band-Gap energy plot and applications.

OR

Demonstrate with example property enhancement of any three (metals, polymers, ceramics) nano-materials with justification.

Q.5 Why optical properties vary with the variation in length scale? Explain the [10]
effective utilization of nano optics in society with economic value.

OR

Give a detailed classification of various biological nano structures. State the role of nucleic acids in Nanotechnology.

Q.6 Enlist the industrial applications of Nano-materials in medicine, defence and [10]
catalysts. State the commercial products and their advantages due to use of Nano materials.

OR

Enlist the industrial applications of Nano-materials in photonics, chemical and textile. State the commercial products and their advantages due to use of Nano materials.

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