

**M. TECH. (NANO TECHNOLOGY) SEM-I (CBCS – 2015  
COURSE) : SUMMER - 2018  
SUBJECT: NANOSCIENCE AND NANOTECHNOLOGY**

**Day: Monday**  
**Date: 28/05/2018**

**S-2018-2940**

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

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**N.B:**

- 1) All questions are **COMUPLSORY**.
  - 2) Figures to the right indicate **FULL** marks.
  - 3) Draw neat and labeled diagram **WHEREVER** necessary.
  - 4) Assume suitable data if necessary.
  - 5) Answers to the section should be written in **SEPARATE** answer book.
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**SECTION-I**

**Q.1** Define Nanotechnology and Nanoscience. Explain with a suitable example the length scale effect of any nano-material with respect to its properties, method of synthesis and applications. (10)

**OR**

Define Nanotechnology and Nanoscience. Explain with suitable example molecular and atomic size with respect to surface area or dimensional space. (10)

**Q.2** Differentiate between mechanical grinding, gas phase synthesis and wet chemical synthesis with respect to principle, cost, time, particle size, operations and applications with suitable example. (10)

**OR**

Give the classification of nanostructure with respect to method of synthesis with suitable example. (10)

**Q.3** What is band gap energy? Explain its importance with suitable example. (10)

**OR**

Explain why nano gold changes its color at the different particle size. (10)

**SECTION-II**

**Q.4** Define and explain 'Evolution of band structure and Fermi surface'. (10)

**OR**

Explain the different parameter on which the properties of nanostructure can be varied with suitable example. (10)

**Q.5** Define 'Quantum dots'. State their synthesis methods, physical properties and applications in various fields with suitable examples. (10)

**OR**

Explain with suitable example how optical and magnetic property is altered by any nanostructure. (10)

**Q.6** State the various applications of nano-material in the area of automobile, chemical industries, electronics and medical field. (10)

**OR**

Discuss the role of Nanotechnology in remediation of pollution and green houses gases. Justify with suitable example. (10)

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