

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

SUBJECT: NANO CHEMISTRY

Day: **Friday**
Date: **19/01/2018**

W-2017-2748

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

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Both the sections should be written in **SEPARATE** answer books.
- 3) Figures to the **RIGHT** indicate **FULL** marks.
- 4) Draw neat labeled diagrams **WHEREVER** necessary.
- 5) Assume suitable data, if necessary.

SECTION –I

Q.1 Discuss the optical properties of nanomaterials. Which changes are observed in their properties due to size reduction?

OR

Explain 'Entropy' and 'Enthalpy'. State their potential application in nanochemistry.

Q.2 Describe the phenomenon of Fluorescence. State how it can be experimentally estimated.

OR

Discuss the differences between various types of chemical bonds. Give suitable examples.

Q.3 State and explain the Gibb's phase rule. Describe the water system.

OR

Define 'Raman effect'. Explain the quantum and classical theory of Raman scattering.

SECTION –II

Q.4 Explain the concept of hybridization, considering the example of CNTs.

OR

Describe the significance of molecular orbital theory to study nanomaterials.

Q.5 Discuss the advantages and limitations of the Activated Complex theory.

OR

Discuss various methods for experimental measurement of diffusion.

Q.6 State the significance of organo-metallic compounds for synthesis of oxide nanoparticles.

OR

Write short note on

- a) Kirkendall effect.
- b) Jablonski diagram.

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