Name of the Department : Physics

Name of the course : B.Sc. Prog. _CBCS_DSE

Name of Paper : Nanomaterials and Applications

Semester : V

Unique Paper Code : 42227532

Question Paper Set number : Set A

Total Time: 3 Hour **Maximum Marks: 75**

Instructions for Candidates:

(a) Attempt any **Four** questions in **all**.
(b) **All** questions carry equal marks.
(c) Symbols have their usual meanings.

1.What do you understand by the length scales in nanosystems? Discuss them with examples. What is nanoscience and nanotechnology? How nanomaterials and nanostructures are Classified.

2.What is the top down and bottom up approach for the synthesis of nanomaterials? Describe the mechanical methods for the Synthesis of nanomaterials with the help of detailed diagram.

3. Discuss briefly about the different characterization techniques available for nanomaterials? Explain in detail the X-ray diffraction method for crystal structure determination. What parameters or information one can extract from the XRD data of a material.

4.What are dielectric materials? How the concept of dielectric constant and Coulomb interaction is explained for the nanostructures.

5.What is Coulomb Blockade? How this effect can lead to single electron transistor? Explain briefly Coulomb blockade thermometer.

6.What are different types of Carbon nanomaterials? Describe Carbon nanotubes in detail with their types and growth mechanism.