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**PG2S-265-B-23**  
**M.Sc. II Semester (CBCS) Degree Examination**  
**MATERIALS SCIENCE**  
**Nanoscience and Technology**  
**Paper : OET 2.1**

**Time : 3 Hours**

**Max. Marks :80**

**Instruction to Candidates:**

1. *Write the Q.No. clearly.*
2. *Draw a neat labeled diagram, wherever necessary.*

**PART - A**

**Answer any Eight of the following :** **(8×2=16)**

1.
  - i) "There is plenty of Room at the bottom". Comment.
  - ii) Comment on the surface energy of nanomaterials.
  - iii) Write briefly the Bottom-Up approach of nano synthesis.
  - iv) Briefly explain the Polyol route of nano synthesis.
  - v) What are quantum dots?
  - vi) Give the Bragg's condition for x-ray diffraction.
  - vii) List the various characterization techniques of nano materials.
  - viii) What is STM based Lithography?
  - ix) What are Molecular memory and Atomic memory?
  - x) What is wearable electronics?

**PART - B**

**Answer any Four of the following:** **(4×16=64)**

2. Describe how the quantum confinement effect and the reduced dimensionality account for the Quasi-one, Quasi-two dimensional and quantum dot aspects of nano materials.
3. Explain the synthesis of nanomaterials by Physical Vapor Deposition process.
4. Explain the Sol-Gel synthesis of nano synthesis.
5. Describe the construction, working principle of Tunneling Electron Microscope.
6. Highlight the salient features of Graphene and its applications.
7. Write a short note on any Two of the following: **(2×8=16)**
  - a) Magnetic nano particles.
  - b) Thin film characterization techniques
  - c) Applications of Fullerenes.