



Name :

Roll No. :

Invigilator's Signature :

CS/M.Phil (MS)/SEM-1/MSPH-103/2010

2010

**SCIENCE AND TECHNOLOGY OF NANO AND
MESOPARTICLES**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

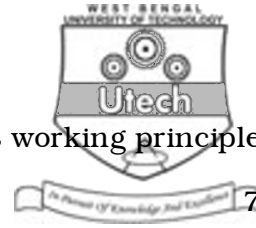
*Candidates are required to give their answers in their own words
as far as practicable.*

Answer any five questions. $5 \times 14 = 70$

1. a) What is Density of state ? Calculate the density of state for Quantum Well, Wire and Dot. Draw a comparative diagram of Density of state with Energy.

b) Define effective mass. How it affects the semiconductor band structure ? 7 + 7
2. Explain the process of growth of Quantum Dot using SK growth. Draw the block diagram of MBE system and explain its working principle. 4 + 10
3. Explain the Optical, Thermal, Mechanical and Electronic properties of nanostructured semiconducting materials. 14

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4. a) What is nanolithography ? Explain its working principle. 7
- b) What are the basic differences between TEM and SEM ? 7
5. a) Classify different structures of CNT. 4
- b) Explain different applications of CNT. 5
- c) Draw and explain the operation of CNTFET. 5
6. Write short notes on any *two* of the following : 2 × 7
- a) CVD
- b) MOVPE
- c) VPE
- d) AFM.

