Total No. of Questions : 12]

SEAT No. :

P1402

[Total No. of Pages : 3

[4759]-105

B.E. (E & T/C)

NANOTECHNOLOGY

(2008 Course) (Semester - II) (Elective - IV)

Time : 3 Hours] *[Max. Marks :100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***SolveQ 1 or Q 2, Q 3 or Q 4, Q5 or Q 6, Q7 or Q 8, Q 9 or Q 10, and Q 11 or Q 12 .***
5) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) Explain in detail the fundamental science behind Nanotechnology. **[8]**

b) List the different tools for measuring nanostructures and explain it in detail. **[8]**

OR

Q2) a) What is polymerization? Explain the process of DNA hybridization with schematic. **[8]**

b) What are the different challenges for tools to imagine Nanoscale behavior. **[8]**

Q3) a) Compare Floating Gate NVM and Nanocrystal based NVM. **[8]**

b) Draw and explain the process flow for integrating Nanocrystal memory with standard CMOS technology. **[8]**

OR

Q4) a) Compare between Nanoscale materials and macro scale materials. **[8]**

b) Explain the effect of electron trapping in Novel dielectric material. **[8]**

P.T.O.

Q5) Describe the following terms related to carbon Nanotubes. **[18]**

a) Fabrication

b) Properties and Types

c) Applications

OR

Q6) Write short notes on the following: **[18]**

a) Magic Number and optical properties of Nanoparticles.

b) Single walled and Multi walled carbon Nanotube.

c) Superconductivity in C_{60}.

SECTION - II

Q7) a) Explain the application of Azobenzene molecule in NEMS. **[8]**

b) Explain the process of writing, reading and erasing in Azobenzene molecule using polarization? **[8]**

OR

Q8) a) Explain any two applications of a Cantilever device under MEMS. **[8]**

b) Enlist the advantages of MEMS. **[8]**

Q9) a) Explain the steps involved in nanoimprint using e-beam lithography process. **[10]**

b) Describe the significance of Nano-electronics in Advanced computation applications. **[8]**

OR

Q10)a) Explain Optical and Atomic Lithography. **[10]**

b) Describe briefly the functioning of Scanning Tunneling Microscope. **[8]**

Q11)a) Explain the working of single Electron Transistor and its application. **[8]**

b) Briefly explain the capture of light energy and generation of current in photovoltaic cell. **[8]**

OR

Q12) Write short notes on the following: **[16]**

a) Nanotechnology in Biomedical.

b) Molecular motors.

EEE