

Total No. of Questions : 10]

SEAT No. :

**P4001**

**[4959]-1189**

[Total No. of Pages :2

**B.E.(Chemical)**

**b-NANOTECHNOLOGY**

**(2012 Course)(Elective-IV) (409352)**

*Time :2½Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2,Q3or Q4, Q5 or Q6 , Q 7 orQ 8, Q 9 or Q10.*
- 2) *Figures to the right side indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable data if necessary.*

**Q1)** a) Explain the classification of nanomaterials and special nanomaterials?  
Also discuss the significance of nanoscale size effect? [5]

b) Discuss the synthesis procedure for fullerenes? [5]

OR

**Q2)** a) Explain any two synthesis methods used for carbon nanotubes? [6]

b) How nanomaterials are synthesized by Laser ablation of solid Targets?[4]

**Q3)** a) “Bottom-up technique is more convenient for nano fabrication”-Explain. [5]

b) Differentiate between electric arc discharge method and chemical vapor deposition? [5]

OR

**Q4)** a) Write short notes on characterization techniques based on electron microscopy? [5]

b) With neat sketch explain principle and operation of Atomic force microscopy? [5]

**Q5)** a) Explain how quantum cryptography is used for secure data communication? [8]

b) What are excitons? Why are excitonic effects more important in nanostructures than in bulk materials? [8]

OR

**P.T.O.**

- Q6)** a) What is doping? Explain types of dopants used in extrinsic semiconductor? [8]  
b) Explain How Pauli's exclusion principle is applied in quantum mechanics? [8]
- Q7)** a) Explain experimental procedure for finding out contact angles. Explain with neat sketch? [8]  
b) What are the factors affecting contact angle and wetting? [8]

OR

- Q8)** a) Explain various methods for measuring surface tension? [8]  
b) Write short note on van der waal forces in colloidal particles? [8]
- Q9)** a) What are self cleaning materials? Explain its application? [9]  
b) Explain how drug-delivery helps for treatment of various diseases? [9]

OR

- Q10)** a) Explain in brief the applications of different types of nanomaterials in various fields? [9]  
b) Discuss the health and environmental impacts of nanotechnology? [9]

