

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- (a) Why the conductivity of nanowires is different from their bulk counterpart?
- (b) What is Brownian motion?
- (c) What is surface plasmon resonance?
- (d) What are the affect of pressure on the formation of carbon nanostructure?
- (e) Show that surface-to-volume ratio of nanoparticle is much higher than that of bulk material of the identical material.
- (f) What is quantum confinement?
- (g) What is electrostatic stabilization in agglomeration of nanoparticles?
- (h) What are the consequences of mis-trageting in nanomedical system?
- (i) What is the effect of particle size on the melting point of nanoparticles??
- (j) How will you group the nanostructure materials on the basis of growth media?

(10x1)

UNIT - I

- II. a) Compare the behaviour of Nanostructures prepared by bottom up approach with respect to top-down approach.
- b) Explain the mechanism, working and properties of thermal-evaporation and laser methods for thin film deposition. (2x5)
- III. a) What are primary and secondary particles? What are difficulties in particle synthesis by chemical routes? How the nucleation and Growth takes place from solutions?
- b) Discuss the principle and types of chemical vapour deposition technique? Explain the basic chemical reactions involved in CVD process? Give example. (2x5)
- IV. a) Discuss the formation of magnetic nanoparticles using co-precipitation and hydrothermal method.
- b) What are the possible electrical conduction mechanisms in nanomaterials? (2x5)

UNIT - II

- V. a) What is a molecular colloid? Discuss the origin of charge on colloidal particles. What is meant by electrical double layer? What are the various methods for determining size of colloidal particles?
- b) Explain the various types of chemical bonding involved in nanomaterials. Give example.

(7,3)

P.T.O.

(2)

- VI. a) Discuss the principle, working, advantage and disadvantages of biosensor?
b) Write a short note on (i) Nanorobot (ii) Drug Delivery (2x5)
- VII. a) Explain the biomedical applications of nanomaterials in nano-diagnostics and therapeutics?
b) What are the positive and adverse effects of nanomaterial on environment and human health? (2x5)

x-x-x