M. Tech. (Nano Technology) Sem-I (CBCS – 2015 Course) : SUMMER - 2019

SUBJECT: NANOSCIENCE & NANOTECHNOLOGY

Day: Thursday
Date: 16/05/2019

S-2019-3343

Time: 11.00 AM TO 02.00 PM
Max Marks: 60

N.B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **WHEREVER** necessary.
4) Answers to both the sections should be written in SAME answer books.
5) Assume suitable data if necessary.

SECTION – I

Q.1 Define Nanotechnology. How do you relate Atomic structure of molecule with Phase Energy? What properties of nanostructure are associated with Phase Energy? **[10]**

OR

Elaborate the concept of bottom-up approach for nanoparticle synthesis. Explain with any two methods of same.

Q.2 What are the opportunities at Nano length scale? Discuss with respect to three different types of nanostructures and mention their potential applications. **[10]**

OR

Describe the role of surface energy with respect to the length scale of nano structures. Discuss how the intermolecular forces are influenced by the changes in length scales.

Q.3 With neat sketch and area of application, explain any two properties which are explored at nano length scale. How do thermal and optical properties change with size? **[10]**

OR

Differentiate between CNT's, Graphene, Quantum Dots and fullerence with respect to composition, properties, applications and synthesis process.

SECTION – II

Q.4 Explain with suitable example inter dynamic aspects of inter molecular forces at macro, micro and nano scale level. **[10]**

OR

"The properties of material changes with change in size of particles". Justify sentence for macro, micro and nano materials with suitable examples.

Q.5 How does the influence of nano structuring alter the mechanical and optical properties of nanomaterials? Explain with suitable example. **[10]**

OR

What is gramsize effect? Explain its effect on strength of metal optical properties of quantum dots and quantum wires with suitable example.

Q.6 State at least five applications of nanomaterials in area of electronics, mechanical, chemical, civil, electrical, biology, polymers and medical. **[10]**

OR

State with examples applications of nanomaterials in remediation of pollution, photocatalysis, green house gases and global warming.

* * * *