Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Chemistry) (2015 to 2017 Batch E-II) (Sem.–4)

NANOCHEMISTRY

Subject Code : MSCH-411

Paper ID : [A2811]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. **Attempt Five questions in all including question no 1 which is compulsory and selecting one each from unit I to IV.**

l. Answer briefly :

a) What do you mean by electron microscopy?

b) Name properties which makes nanoscale materials different from their bulk counterpart.

c) Write two examples of self assembled monolayers and their applications.

d) What is the structure of fullerene?

e) What are the methods to avoid the agglomeration of nanoparticles during synthesis?

f) Define the term 'Dynamic Light Scattering'.

g) Define the term 'Biometrics'.

h) Define the term 'Nanomedicine'.

i) What are molecular switches?

j) Explain the term micro-electronics. (2×10=20)

UNIT-I

2. Explain the term "Nanomaterials". How Chemistry is useful in the synthesis of nanomaterials? Describe the "Self Assembly Technique". (20)

3. Discuss the following :

   a) DNA based sensors.

   b) Molecular logic gates. (10+10)

UNIT-II

4. Describe the term 'Nano Lithography'. Discuss this technique in detail and its applications in Nano-electronics. (20)

5. Explain the following techniques for the synthesis of nanomaterials :

   a) Sol-gel technique

   b) Chemical Vapor Deposition technique (10+10)

UNIT-III

6. Describe different scattering techniques used for the characterization of nanostructured materials. (20)

7. Discuss the principle of Atomic force microscopy (AFM). Describe the technique in detail with detailed diagram. (20)

UNIT-IV

8. What do you mean by 'Bionano Composites'? Discuss the advantages and applications of 'Bionano Composites'? (20)

9. Discuss the role of nanotechnology in the following areas :

   a) Sensors.

   b) Bionano information. (10+10)