

2063
M. Tech. (Material Science and Technology)
Second Semester
MT-201: Nanomaterials

Time allowed: 3 Hours

Max. Marks: 50

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

x-x-x

- I. a. Give the difference between dative bonds and ionic bonds with example.
b. What is ball milling?
c. Name two methods of testing of size distribution.
d. Give two examples of nanomaterials used in drug delivery.
e. What is zeta potential?

(5X2)

Part A

- II. (a) Explain what are nanocomposites and give their methods of preparation. (5)
(b) What do you understand by ball milling and chemical bath deposition? (5)
- III. (a) Differentiate between top down and bottom up approaches for the synthesis of nanomaterials. Use relevant examples. (7)
(b) Discuss how to analyse the size distribution of synthesized nanomaterials? (3)
- IV. (a) What are semiconducting Quantum dots? Give their advantages over conventional organic dyes? (5)
(b) Write a short note on biosynthesis of nanoparticles. (5)

Part B

- V. (a) Describe the toxicity of nanomaterials and how can this issue be addressed? Use specific examples. (7)
(b) Give a brief overview of the design of a biosensor and cite two examples. (3)
- VI. (a) Explain the various processes of purification of colloidal solutions. (7)
(b) Write short notes on the following types of chemical bonds in nanomaterials
(i) Van der waal interactions (ii) hydrogen bonds (3)
- VII. (a) Describe in detail electric double layer theory of colloids with the help of diagram. (7)
(b) Explain uses of nanomaterials in diagnostics (3)

x-x-x