R07 **Set No. 2**

IV B.Tech II Semester Examinations,APRIL 2011
NANOTECHNOLOGY
Mechanical Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. Explain about different applications of nanomaterials.   [16]

2. (a) What is tectodendrimers? Explain.

   (b) What is nanoshell? Explain.   [16]

3. What is the requirement of a nanosensor? Explain.   [16]

4. Briefly explain about microwave sintering of Alumina nano particles.   [16]

5. Explain AC Conduction in nano particals taking some examples.   [16]

6. Compare and contrast optical and electron microscopies.   [16]

7. What are reciprocal lattice vectors? Explain the concept of Brillouin zone and band gap. When do electrons suffer Bragg reflection?   [16]

8. Define anti ferromagnetism. Mention two materials that exhibit antiferromagnetism.   [16]

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R07

Set No. 4

IV B.Tech II Semester Examinations,APRIL 2011
NANOTECHNOLOGY
Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. What are nanopowders? Explain about the properties of nanopowders.   [16]

2. Give some examples of Nano Particles and their applications in detail.   [16]

3. What are the nanomaterials for biological applications?   [16]

4. (a) Explain the role of Aluminum Nitride in sintering of nano SiC.

   (b) Explain the role of Boron Carbide in sintering of nano SiC.   [8+8]

5. What are the differences between molecular machines and macroscopic machines?   [16]

6. Explain why triplet states have lower energy compared to singlet states in an electron system.   [16]

7. Write a note on electron gun of a typical SEM.   [16]

8. What are structural ordering of ferrites and class of ferrites?   [16]

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R07

Set No. 1

IV B.Tech II Semester Examinations,APRIL 2011
NANOTECHNOLOGY
Mechanical Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) How Batch attritors work in attrition milling of SiC.

   (b) Write a note on ultrafine particles of Silicon Carbide.   [8+8]

2. Draw the schematic diagrams depicting the working of the following:

   (a) Scanning Tunneling Microscope

   (b) Atomic Force Microscope.   [16]

3. Explain the Tunneling Conduction in Nano Particles.   [16]

4. Give various reported applications for chitosan.   [16]

5. Write about immunogold labeling.   [16]

6. (a) Explain variation of temperature and magnetic field.

   (b) Explain the stress intensity factor.   [8+8]

7. State and explain Pauli's exclusion principle in detail.   [16]

8. Explain about ion implantation method in detail.   [16]

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R07

Set No. 3

IV B.Tech II Semester Examinations,APRIL 2011
NANOTECHNOLOGY
Mechanical Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. Explain how will you move atoms (manipulate atoms) on a sample surface using STM? [16]

2. (a) Describe the spinels.

   (b) State super-paramagnetis. [8+8]

3. (a) Explain about sample preparation from nano particles for sintering.

   (b) What are the sintering procedures of nano particles? [8+8]

4. Explain about RF sputtering method in detail. [16]

5. What are the molecular properties used to achieve mechanical functions? [16]

6. Discuss the nature of solutions of the following differential equation:
   $\frac{d^2y}{dx^2} + f(x)y = 0.$ [16]

7. How can biomolecules be used for nanomaterial assembly? [16]

8. Simple technique of creating nano-crystalline particles of magnetite within a glassy matrix in terms of heat-treatment at different temperatures toprecipitate small nano crystals, explain. [16]

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