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**Third Semester B.E. Degree Examination, Dec.2014/Jan.2015**  
**Foundations of Nanoscale Science and Technology**

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART - A**

1. a. Give a short note on interdisciplinary nature of nano science and nano technology. (04 Marks)  
b. Explain in detail about surface – to – volume ratio. (06 Marks)  
c. Explain the types of nanotechnology with applications. (08 Marks)  
d. What are nano machines? (02 Marks)
2. a. What are quantum dots and nano wires? (02 Marks)  
b. Explain about nano sheets with example. Mention its properties and applications. (08 Marks)  
c. Write a brief note on importance of nano scale materials and their devices. (05 Marks)  
d. Explain briefly Top – Down and Bottom – Up approaches. (05 Marks)
3. a. Explain the magnetic properties of nano materials. (10 Marks)  
b. Explain the varying properties of gold at nano scale. (05 Marks)  
c. Give a short note on the thermal properties of nano materials. (05 Marks)
4. a. Write a note on the properties and applications of nanopores and nano composites. (10 Marks)  
b. Explain briefly about particle size, shape, density, melting point, wettability and surface tension. (10 Marks)

**PART - B**

5. a. Write a note on nano scale magnets and transparent magnetic materials. (06 Marks)  
b. Explain the catalytic property of gold nano particles. (04 Marks)  
c. Explain briefly the quantum size effects. (10 Marks)
6. a. What is mean by surface modification? Explain the surface modification of inorganic nano particles. (10 Marks)  
b. Explain the developments on skin care cosmetics using PLGA nano spheres. (10 Marks)
7. a. Explain the mechanism involved in pin point drug delivery and gene delivery. (10 Marks)  
b. Explain the mechanism of drug delivery to brain by active targeting. (10 Marks)
8. a. Explain briefly about the synthesis and properties of ferro fluids. (10 Marks)  
b. Write a short note on shape memory alloys. (05 Marks)  
c. What are piezoelectric materials? Explain with examples. (05 Marks)

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Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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