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**B.E / B.Tech ( Full Time ) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013**

**ELECTRICAL AND ELECTRONICS ENGINEERING**  
VIII Semester

**EE9027 NANOTECHNOLOGY**

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

1. What are the induced effects due to increase in surface area of nanoparticles?
2. Differentiate between Quantum dots and Quantum Wells.
3. What is soft lithography ? Mention its significance.
4. Which etching technique is more suitable for IC fabrication? Why?
5. What is clean room? Mention its requirements.
6. What is the maximum number of particles ( $\geq 0.1\text{m}/\text{m}^3$ ) permitted in an ISO 1 clean room.
7. List the applications of SIMS.
8. Compare EDX and EELS techniques.
9. What is target drug delivery? List its merits.
10. Draw the Molecular structure for AND gate

**Part – B ( 5 x 16 = 80 marks)**

11. (i) Compare the properties of macro, micro and nano particles. (4)  
(ii) Discuss in details the various properties and applications of gold and silver nanoparticles (12)
12. a) List the different types of bottom up approaches for synthesis of nanopowders and explain the Sol-Gel preparation technique in detail.  
**OR**  
b) With neat diagram explain the atomic layer deposition technique in detail.
13. a) Explain in detail the various steps involved in lithography process also discuss any one suitable type of lithography for fabrication of nano devices.  
**OR**  
b) (i) Write a technical note on various clean room standards. (8)  
(ii) Write a note on implications of nanoscience and nanotechnology on society. (8)
14. a) Explain the construction, working and different modes of operation of Scanning Electron Microscopy with neat sketches also mention its Applications.  
**OR**  
b) What are the different types of surface analysis techniques? Explain any one of them with neat diagrams.

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15. a) Explain the principles of quantum tunneling and quantum transport devices. With neat diagrams explain the Quantum computing Automata for realization of logical gates.

**OR**

- b) What are the architectural characteristics of carbon nanotubes? Also explain the synthesis technique for preparation of CNT and list its various applications.