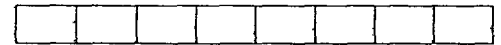


20/11/13-



B.E/B.Tech (Full-Time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC2013
MATERIALS SCIENCE AND ENGINEERING BRANCH
FIFTH SEMSTER-REGULATION 2008

ML9305- Introduction to Nanotechnology

Time: 3Hr

Max.Mark:100

Answer ALL Questions

Part –A (10x2=20 Marks)

15

1. What is lotus effect and what is its application in nanotechnology
2. What are the limitations of photolithography?
3. Why three sided pyramid indenter is mostly used for nano indentation?
4. Write the principle of STM
5. What is quantum confinement effect?
6. What are the drawbacks of RCS and ARB process?
7. Which of the processes yields more impurities in the CNTs?
8. What is 5-7-7-5 defect in CNT?
9. What is phase stability?
10. If the grain size is reduced below certain nanometer, the grains start rotate/slide which result in reduction in hardness. – Then how super hardness can be achieved?

Part – B (5x16 = 80 Marks)

- 11 Explain the usefulness of nanostructured coatings in cutting tool applications. (16)
and also discuss the methods to access the thermal stability of the coatings
- 12a Discuss the characterization method with AFM, and explain the eigen modes (16)
of deformation during cantilever dynamics.
- OR**
- 12b Explain the working principle and applications of SNFOM (16)
- 13a Explain the Mechanochemical synthesis of nanoparticle production with an (16)
example
- OR**
- 13b (i) What is 'nano-indentation'? Explain the factors influencing on (8)
nanoindentation
- (ii) Explain how the 'E' Value is calculated from nano indentation test (8)
- 14a (i) Discuss the mechanism of solid phase growth of CNT. (8)
- (ii) What is functionalization? Explain different types of functionalization used. (8)
- OR**
- 14b Discuss the principle of VLS technique for the synthesis of nanowire (16)
- 15a Explain at least two methods for the production of Quantum dots (16)
- OR**
- 15b Explain the effects controlling the properties of nanostructured materials (16)