

ANNA UNIVERSITY COIMBATORE  
B.E. / B.TECH. DEGREE EXAMINATIONS : JAN - FEB 2009  
REGULATIONS : 2007  
SECOND SEMESTER – COMMON TO ALL BRANCHES  
070200001 /4MC1201 – MATERIAL SCIENCE

Time : 3 Hours

Max.Marks : 100

PART – A (20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

- What is a compound semiconductor? Give an example.
- What is Hall Effect?
- Calculate the band gap energy of GaAsP semiconductor whose output wavelength is  $6715\text{\AA}$ .
- What is the principle used in zone refining techniques.
- What is ferrimagnetism? Give an example for ferrimagnetic material.
- What are the properties of ideal soft magnetic material?
- What are high temperature superconductors? Give two examples.
- Write any four applications of ferrites.
- What are shape memory alloys? Give two examples.
- What is Cryotron?
- What is Meissner effect?
- What are metallic glasses? Give two examples.
- What are top down and bottom up processes in fabrication of nano particles.
- List out any two advantages and two limitations of chemical vapor deposition technique.
- What are quantum dots?
- Give any two methods for templating the growth of nano materials.
- Mention the types of nano magnetic materials.
- Define Giant Magneto Resistance.
- What are injection lasers?

20. What is Coulomb blockade effect? ✓

PART – B (5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. (a) Explain Hall effect with necessary diagram and derive an expression of Hall coefficient for extrinsic semiconductor. (6)
- (b) Describe Czochralski's technique with a neat diagram for preparing single crystals. (6)
22. (a) Explain the principle, construction and working of LED. (6)
- (b) Explain the principle, construction and working of a solar cell with a neat diagram. (6)
23. (a) Describe magneto optical recording and reading with necessary diagrams. (6)
- (b) Explain Heisenberg's theory of ferromagnetism. (6)
24. (a) Explain the shape memory effect and pseudo elasticity of shape memory alloy with necessary diagrams. (6)
- (b) Explain the properties and applications of nanomaterials. (6)
25. (a) What is Sol-Gel process? Explain how nanoparticles are prepared by Sol-Gel process. (6)
- (b) Compare Molecular Beam Epitaxy (MBE) with Metal Organic Vapor Phase Epitaxy (MOVPE). (6)
26. (a) Discuss the properties and applications of carbon nanotubes. (6)
- (b) What is electrochemical deposition? Explain how this technique is used in templating the growth of nano wires with necessary diagram. (6)

- (a) Explain the principle, construction and working of organic field effect transistor (6)
- (b) Describe the construction and working of magnetic force microscopy. (6)

Write notes on :

- a) Strain gauges (6)
- b) Hard nanomagnets (6)

\*\*\*\*\*THE END\*\*\*\*\*