Roll No.								

B.E. (FULL TIME) DEGREE END SEMESTER EXAMINATIONS - APRIL / MAY 2011

MATERIALS SCIENCE AND ENGINEERING - III SEMESTER - REGULATION 2008

ML 9204 – MATERIALS STRUCTURES AND PROPERTIES

Time : 3 Hours Max. Marks : 100

ANSWER ALL QUESTIONS

20

PART – A (10 X 2 = 20 Marks)

1. Draw the BCC unit cell and show the atom position.
2. In a cubic lattice, show the (111) Plane.
3. In a two dimensional simple cubic lattice, show the edge dislocation.
4. Write down the eutectic phase reaction.
5. Give the names of four different cast irons
6. Give one application for nichrome and tungsten carbide.
7. Give two examples of advanced ceramic materials.
8. Give two applications of composite materials.
9. What is the difference between thermoplastics and thermosetting plastics?
10. Give two examples of biomedical applications of polymers.

PART – B (5 X 16 = 80 Marks)

11 Discuss in detail ionic, covalent, metallic and van der waals bonds by giving one example of a material for each bond type.

12.a) i) Discuss in detail, with examples, point defects and surface defects. **(8)**

ii) List the Hume-Rothery rules for substitutional solid solution formation. **(8)**

(OR)

b) i) Give the Gibb's phase rule. **(4)**

ii) With the phase diagrams, explain peritectic and eutectoid phase reactions. **(12)**

13.a) Draw the iron-iron carbide phase diagram and label all regions in it.

(OR)

b) i) Explain the different heat treatment processes. **(12)**

ii) Give two factors affecting the conductivity of metals. **(4)**

14.a) Explain in detail the properties and applications of silicate ceramics and glass ceramics.

(OR)

b) Explain in detail the properties of different composite materials.

15.a) i) Explain the mechanisms of polymerization. **(12)**

ii) List four commercially important polymers. **(4)**

(OR)

b) Write short notes on elastomers, liquid crystal polymers and conductive polymers.