Printed Pages : 3 TME301

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4068 Roll No.

B.Tech

(SEM III) ODD SEMESTER THEORY EXAMINATION 2009-10

MATERIAL SCIENCE

Time : 3 Hours] *[Total Marks : 100*

Note : *Attempt all questions :*

1 Answer any **two** of the following : **10×2=20**

(a) Describe following types of primary and secondary bonding :

(i) Ionic

(ii) Covalent

(iii) Metallic

(iv) Flucluating dipole

(v) Permanent dipole

(b) Find for SC, BCC and FCC crystals; number of atoms per unit cells, relationship between atomic size and lattice parameter and atomic packing fraction.

(c) Enlist Bravais crystal system. Also briefly describe X-ray crystallography methods.

2 Answer any **two** of the following : **10×2=20**

(a) Enumerate the purpose for which a microscopic examination is required. Describe the method of determining grain size of a metal.

(b) Briefly describe :

(i) Hardness testings and

(ii) Impact testings

(c) Describe Griffith's theory of briltle fracture. Obtain the expression for fracture stress in glass.

3 Answer any **two** of the following : **10×2=20**

(a) Draw Fe-Fe_3C phase (equilibrium) diagram and label the phase fields. Discuss in brief the different reactions that take place in this system.

(b) Describe Heat-treatment processes and its usefulness.

(c) Mention the composition, properties and applications of the following :

(i) Stainless steels

(ii) HSS

(iii) Gun metal

(iv) Duralumin

(v) Ferritic

(vi) Martensitic

4 Answer any **two** of the following : **10×2=20**

(a) Briefly describe the types of semiconductors, its devices and its applications.

(b) What is superconductivity ? What are the properties of superconductors. Draw the curve of resistivity versus temperatures for normal metal and superconductors. Also, write applications of superconductors.

(c) Define magnetostatic energy. How can be magnetostatic energy of a ferromagnetic material be minimized with respect to magnetic dipole alignment ?

5 Write short notes on any **four** : **5×4=20**

(a) Addition polymerization and condensation polymerization

(b) Particulate composites

(c) Mechanical behaviour of ceramics

(d) Future of plastics

(e) Creep curve

(f) Corrosion and its control.