



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) Fluctuating 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.

JJ-4068]



1

[Contd...

M

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 brittle fracture. Obtain the expression for fracture stress in glass.

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

- (a) Draw Fe-Fe<sub>3</sub>C 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

M

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.

