B. Tech.

(SEM. IV) EXAMINATION, 2006-07
MATERIAL TECHNOLOGY

Time : 2 Hours] [Total Marks : 50

Note : Attempt all questions.

1. Attempt any four parts of the following : 3.5x4

(a) What are the types of steel used for making nails, machine parts, ball bearings and cutting tools?

(b) Under high pressure conditions which material is used: mild steel, stainless steel or carbon steel and why.

(c) What are the advantages of a phase diagram and what all information can be obtained from it?

(d) What is eutectic point and what is its significance?

(e) What are the various phases present in a plain carbon steel?

(f) Explain the concepts of nucleation and crystal growth of a material. On what factors does it depend?
2 Attempt any four parts of the following:
   (a) What are the differences between elastic and plastic deformation.
   (b) Define the terms Poisson’s ratio and ductility.
   (c) Describe the process of diffusion in materials.
   (d) What are the causes of fracture in metals?
   (e) What is the significance of TTT curve.
   (f) Discuss the various methods of corrosion prevention and control.

3 Attempt any four parts of the following:
   (a) Define the term stainless steels. What are its main types?
   (b) What are microalloyed steels and what are their applications?
   (c) How pig iron is converted to steel?
   (d) Describe the term metallic glass. Give examples.
   (e) What is the composition of cutting alloys and high-speed steel?
   (f) Draw the schematic diagram of a three element ternary phase diagram.

4 Attempt any four parts of the following:
   (a) What are the various types of glasses? Give examples.
   (b) List three reasons why ceramic materials are more brittle than metals.

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(c) Explain whether polymers can be classed as crystalline, amorphous or semi-crystalline and why.

(d) What are the differences between thermoplastics and thermosets? Explain with respect to chain structure. Give examples.

(e) What are the differences between emulsion and interfacial polymerization techniques? List advantages and disadvantages of emulsion and interfacial polymerization techniques.

(f) What is the significance of glass transition temperature? Discuss the change in properties before and after glass transition temperature.