

R07**Code: R7210306**

B.Tech II Year I Semester (R07) Supplementary Examinations, May 2013

METALLURGY & MATERIAL SCIENCE

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What is the importance of grain size in steel? How do you determine grain size of the given steel?
(b) Explain why grains are stronger than grain boundaries at high temperature and grain boundaries are stronger than grains at room temperatures.
- 2 (a) Discuss in detail the necessity of alloying with few examples.
(b) Explain how are alloys actually made in industry.
- 3 (a) Discuss the effect of alloying elements in Fe-Fe₃C diagram.
(b) Discuss the effect of carbon on:
(i) Mechanical properties.
(ii) Grain size.
- 4 (a) Give the classification of stainless steels.
(b) Explain each type of steel with chemical composition, microstructure, properties and applications.
- 5 Draw the representative cooling curves for annealing, normalizing and hardening on an isothermal transformation diagram of an eutectoid steel and explain.
- 6 (a) What are the important uses of pure copper? Indicate the general relationship between properties and the phase diagram of the copper-zinc system.
(b) Briefly classify the brasses and give examples.
- 7 (a) Briefly explain few mechanical properties of ceramic materials. Also describe how the strength of the glass can be increased.
(b) Discuss briefly glass forming.
- 8 (a) Define composite materials. Discuss briefly, giving examples classification of composites. Indicate their advantages and limitations.
(b) What are the important characteristics of composite materials? Discuss their important applications.
