Code No: NR311803 **NR**

III B.Tech I Semester Supplementary Examinations, November 2005
HEAT TREATMENT TECHNOLOGY
(Metallurgy & Material Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Draw Fe-Fe_3C phase diagram and label the phase fields. Discuss the different reactions that take place in this system? [16]

2. Differentiate between:
   (a) Process annealing and Recrystallization annealing. [6]
   (b) Spheroidising and Diffusion annealing. [5]
   (c) Stress relieving and tempering [5]

3. (a) What is the significance of post-carburising heat treatment. [8]
   (b) What are the various methods used in general for flame hardening? Explain? [8]

4. (a) What is secondary hardening. [2]
   (b) What are the effects of alloying elements on tempering. [4]
   (c) Discuss the effect of alloying elements on time, temperature and transformation curves with respect to their position and shape. [10]

5. (a) With the help of Iron-Iron carbide diagram explain the cooling behavior of Hypo eutectic cast irons with 3% carbon from liquid state to room temperature. [8]
   (b) Explain the cooling behavior of eutectic cast iron with the help of iron-ironcarbide diagram? [8]

6. (a) Explain the properties and microstructure of spheroidal graphite cast irons. [6]
   (b) What are the nodulizing elements added to the ladle to get S.G.Iron? Explain its importance? [6]
   (c) Give the process sheet for the heat treatment of white cast Irons to produce malleable cast Irons. [4]

7. Write short notes on the following with respect to composition, properties, Microstructure and applications of
   (a) Cupronickels [8]
   (b) Gilding metal [8]

8. (a) Draw lead-tin equilibrium phase diagram and label all phases in it. [6]
   (b) Explain the various physical and mechanical properties of lead? [4]
   (c) What are the important lead alloys. Explain any Two of them in detail. [6]

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