CODE NO: RR 311803

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER REGULAR EXAMINATIONS
HEAT TREATMENT TECHNOLOGY
(METALLURGY & MATERIAL TECHNOLOGY)

NOVEMBER 2005

TIME: 3 HOURS
MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks

MARK [5*16]

1. (a) Explain the Transformation of Pearlite into Austenite?

(b) Discuss the e ect of time and temperature on Transformation of pearlite to austenite? [

2. (a) Discuss the determination of hardenability by Jominy end quench test.

(b) Discuss how hardenability is a ected by

i. Austenitic grain size
ii. Carbon content
iii. Presence of alloying elements?

3. (a) Any combination of heat treatment and plastic deformation by cold working cannot be re ered to as thermomechanical treatments. Discuss.

(b) Explain the process, microstructure, and properties of Ausforming of steels with neat diagram.

4. Discuss the function of

(a) Nickel in maraging steel and austenitic stainless steel.

(b) Chromium in stainless steel and high speed steel.

(c) Manganese in Hadfield steel and austenitic stainless steel.

(d) Silicon in transformer steel and spring steel.

5. (a) What are cast irons? Give its importance in the Metallurgical Curriculum?

(b) Compare and contrast steels and cast Irons.

6. (a) What are ferrito - pearlitic malleable cast irons? Explain.

(b) What are black heart malleable cast irons? Explain

(c) What are white heart malleable cast irons? Explain

7. (a) Explain in detail the precipitation hardening process?

(b) Explain the coherent lattice theory to explain the age hardening phenomenon.

8. (a) Draw lead-tin equilibrium phase diagram and label all phases in it

(b) Explain the various physical and mechanical properties of lead?

(c) What are the important lead alloys. Explain any Two of them in detail.