B.E./ B.TECH. (FULL-TIME) DEGREE END SEMESTER EXAMINATIONS- APRIL/MAY 2011

MATERIALS SCIENCE AND ENGINEERING BRANCH
V SEMESTER
ML 9304 – HEAT TREATMENT TO METALS AND ALLOYS
(REGULATIONS 2008)

23

Time : 3 Hours Max. Marks : 100

Answer ALL Questions

PART-A (10 x 2 = 20 Marks)

1. Label the allotropic modifications of iron with the help of a neat diagram.
2. What do you understand by hypoeutectoid steel and hypereutectoid steel?
3. Name any four factors affecting hardening process.
4. What is tempering?
5. What are the various methods of detecting hardenability?
6. What is bornizing?
7. Why do hot-cold working is categorized as thermo mechanical treatment?
8. What is the significance of controlled atmospheres in heat treatment?
9. Suggest a suitable heat treatment for the manufacturing of chisels and shear blades.
10. Why does oxidation of steel component take place during heat treatment?

PART-B (5 X 16 = 80 Marks)

11. Explain the transformations taking place in hypereutectoid steels with a neat diagram.

12. a) Explain the process of martempering with the help of suitable diagram

(OR)

b) Discuss how hardenability is affected by
(i) Austenitic grain size, (ii) Carbon content and (iii) Presence of alloy elements.

13.a) i) Explain Gas carburizing. (10)
ii) List the advantages and limitations of this process. (6)

(OR)

b) i) What is a laser hardening process? (8)
ii) Discuss the basic difference between laser heat treatment process and other conventional processes. (8)

14.a) With the help suitable diagram explain the **principle**, **process** and **applications** of cryoforming.

(OR)

b) i) Give a detail account of classification of heat treatment furnaces. (6)
ii) Enumerate salient features of "Lift-off cover" furnaces. (6)
iii) What are its various industrial applications? (4)

15.a) Discuss the heat treatment procedure adopted for SG iron castings

(OR)

b) Discuss the various heat treatment process generally applied to nickel and its alloys.