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

MATERIALS SCIENCE AND ENGINEERING BRANCH
V SEMESTER
ML 374 – HEAT TREATMENT OF METAL AND ALLOYS
(REGULATIONS 2004)

Time : 3 Hours Max. Marks : 100

Answer ALL Questions

PART-A (10 x 2 = 20 Marks)

1. What are the allotropic changes in iron?
2. What is eutectic reaction?
3. What is stress relieving?
4. What are the various quenching methods for hardening steel component?
5. Differentiate between hardness and hardenability.
6. What is ion-nitriding process?
7. What is the basic principle involved in thermo-mechanical treatment?
8. What are the advantages offered by salt-bath furnace over other heat treatment furnaces?
9. What are the limitations of plain carbon steels in heat treatment?
10. What are the various reaction involved in decarburization of steel?

PART-B (5 X 16 = 80 Marks)

11. Explain the cooling sequence of 0.6% "carbon" steel from liquid state to room temperature in detail.

12. a) Describe the process of sub-critical annealing and isothermal annealing with neat diagram.

(OR)

b) Describe the Jominy end quenching method of determining hardenability.

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

(OR)

b) Describe the various methods of case depth measurements in steels.

14.a) Give a brief account of various commercially available furnace atmospheres in heat treatment.

(OR)

b) i) What is ausforming? (6)
ii) Enumerate and explain ausforming process variables. (10)

15.a) i) What are the causes of distortion in steels? (8)
ii) Give possible remedies for the same. (8)

(OR)

b) Discuss the heat treatment process adopted for HSS.