18/11/13.

Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

Materials Science & Engineering
Semester V
ML 9304- Heat Treatment of Metals and Alloys
(Regulation 2008)

10

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is the role of Imperfections in Heat Treatment?
2. How the properties of alloys can be improved?
3. What is meant by Temper brittleness?
4. Water is the most commonly used quenching medium .Why?
5. What is the significance of controlled atmosphere in heat treatment?
6. What is age hardening?
7. What is solution Treating?
8. Why white layer is formed during Nitriding?
9. Why we are not heat treating Austenitic Stainless steels?
10. What is the need for sub Zero treatment?

Part – B (5 x 16 = 80 marks)

11. Draw Fe-Fe_3C phase diagram and label the phase fields and Temperature .Discuss in brief the different reactions that take place in this system.

12. a) What are four types of TTT Diagrams. Draw the diagrams and Explain the classification

(OR)

b) With the help of a suitable diagram, explain the process of Martempering. How does it differ from Austempering?

13. a) Discuss how hardenability is affected by
1).Austenite Grain Size,2).Carbon Content,3).Presence of Alloy Element

(OR)

b) i).Discuss the advantages and disadvantages of common Quenchents
ii).Explain in details the Heat treatment of White cast iron and Grey Cast Iron.

14. a) Explain briefly Fick's Laws of diffusion with derivations

(OR)

b) What is laser Hardening process? Discuss the basic difference between laser heat treatment Process and other conventional Process

15. a) Give a detailed account of classification of Heat treatment Furnaces and describe its merits and demerits.

(OR)

b) i).Discuss in detail precipitation hardening of Aluminum Copper Alloy

ii).List various defects normally occurred in heat treated parts and discuss causes and remedies of four such defects.