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**Reg. No. : .....**

**Name : .....**

# Fourth Semester B.Tech. Degree Examination, May 2013
## (2008 Scheme)
## Branch : MECHANICAL ENGINEERING
## 08.403 : Metallurgy and Material Science (MP)

Time : 3 Hours Max. Marks : 100

***Instructions:*** *1) Answer **all** questions in Part **A**.*

*2) Answer **any one full** question from **each** Module of Part **B**.*

PART – A

1. Briefly discuss the electrical properties of materials.
2. Distinguish between BCC, FCC and HCP.
3. What is superplasticity as applied to metals ?
4. State Gibbs Phase Rule.
5. Draw the cooling curve of Pure Iron.
6. Differentiate between Eutectic and Eutectoid steels.
7. Describe briefly Induction hardening process.
8. List the advantages of alloying steels.
9. Explain Griffith theory of Brittle Fracture.
10. Give a brief note on application of ceramics in Engineering industry. **(10×4=40 Marks)**

PART – B

**Module – I**

11. a) What is meant by Multi Indices ? Explain the method of obtaining Muller Indices in cubic crystal. 12

    b) Compare superconductor and semiconductor. 8

P.T.O.

12. a) What are different imperfections in Crystals ? 8

    b) What is strain hardening ? Why do ductile metals strain harden progressively during plastic deformation ? 12

## Module – II

13. a) What are T-T-T curves ? How are they constructed ? 10

    b) With the aid of these curves, describe the effect of alloying elements on the properties of steels. 10

14. a) Sketch Fe – $Fe_3C$ equilibrium diagram and mark the different regions and phases present. 14

    b) Explain the Eutectoid reactions in Fe-C system. 6

## Module – III

15. a) Which are the commonly used alloying elements in steel ? What properties are imported to steel by them ? 10

    b) List important brasses. Give the composition properties and their uses. 10

16. a) Discuss the different types of bearing materials and their applications. 10

    b) What are Nodular Cast Irons ? What are its uses in Engineering field ? 10