



Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, February 2015
(2008 Scheme)**

**Branch : MECHANICAL ENGINEERING
08.403 : Metallurgy and Material Science (MP)
(Special Supplementary)**

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) Answer **all** questions from Part A.
2) Answer **any one full** question from **each** Module of Part B.
3) **Use** suitable sketches for explaining answers.

PART – A

1. Explain any four mechanical properties of engineering materials.
2. Write the differences between BCC and FCC.
3. Explain the concept and use of Burger's vector.
4. Explain strain hardening of materials.
5. Explain Fick's First law of diffusion.
6. What changes takes place in iron, when it is heated from room temperature to its melting point ?
7. Describe Jominy end-Quench test.
8. Differentiate between ductile fracture and brittle fracture.
9. Explain briefly creep mechanism.
10. Write a note on smart materials.



(10×4=40 Marks)



PART – B
MODULE – I

11. a) Explain different types of bonding between atoms. 12
 b) With example, explain how Miller indices of a plane and direction are determined? 8
12. a) Explain mechanisms of plastic deformation. 10
 b) Explain super conductivity and super plasticity. 10

MODULE – II

13. a) What is solid solution? Explain different types of solid solutions with example. 10
 b) With the help of TTT diagram and cooling curves explain formation of various micro structures of iron and steel from austenite. 10
14. a) Describe any four case hardening processes of steel. 12
 b) Write a note on following :
 i) peritectoid reaction
 ii) recrystallisation. 8

MODULE – III

15. a) Describe impact test methods. 10
 b) Explain the effects of any five alloying elements in steel. 10
16. a) Write the names of any five alloys of copper with composition, properties and uses. 10
 b) What is fatigue? Draw S-N curve and explain. What are the methods for improving the fatigue performance of materials? 10

(3×20=60 Marks)

