Reg. No. : ....

Name : ....

Fourth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
Branch : Mechanical Engineering
08.403 : METALLURGY AND MATERIAL SCIENCE (MP)

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 sketches for explaining answers.

PART – A

1. How economic considerations affect selection of engineering materials ?

2. Differentiate between primary bonds and secondary bonds between atoms.

3. Define atomic packing factor and coordination number.

4. Define critical shear stress and explain Schmid's law.

5. Explain Gibb's phase rule.

6. Explain eutectoid reaction with examples.

7. Briefly explain Recrystalisation and Grain growth.

8. Describe Griffith's crack theory.

9. Write down the composition, properties and uses of different types of carbon steels.

10. Write a brief note on Nano materials.   **(10×4=40 Marks)**

PART – B   (3×20=60 Marks)

MODULE – I

11. a) Name and draw seven crystal systems. Write space lattices possible in each system.   **14**

    b) Explain super conductivity.   **6**

12. a) Explain point defects and line defects in crystals.   **10**

    b) Explain the following :
      i) Thermal properties of materials
      ii) Slip.   **10**

MODULE – II

13. a) Draw TTT diagram and explain how it is constructed ? What are its uses ?   **12**

    b) Differentiate between peritectic and peritectoid reactions. Give examples of each reaction.   **8**

14. a) What is hardenability ? Explain Jominy-end quench test.   **10**

    b) Describe nitriding and induction hardening processes.   **10**

MODULE – III

15. a) What is creep ? Explain creep mechanism.   **12**

    b) Explain any two corrosion resistant alloys with composition and uses.   **8**

16. a) Explain about bronzes and brasses.   **12**

    b) What is fatigue ? Explain S-N curve.   **8**

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