No. of Printed Pages : 2

BIME-005

01923

B.Tech. MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

December, 2012

BIME-005 : MATERIAL SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : (i) *All the questions are to be answered in English language only.*

(ii) *Attempt **any seven** questions. Use of calculator is **allowed.***

---

1. Differentiate between crystalline and non-crystalline solids. What Factors promote crystalline solid structures ? **10**

2. Draw the Iron- Carbon Equilibrium Diagram and label the phase fields. Discuss in brief the different reactions that take place in the system. **10**

3. (a) Define the term Heat Treatment and enumerate its objectives. **5**

   (b) Expalin the terms: Resilience, Hardness, Strength, Toughness, Ductility. **5**

4. (a) Compare hard and soft magnetic materials. Why is soft magnetic material preferred over a hard magnetic material for use in the transformer core ? **5**

(b) What are semi conductors ? What are their characteristics and where are they used ? 5

5. What are polymers ? Explain various polymerisation mechanisms. Differentiate between addition and condensation polymerisation mechanism. 10

6. What do you understand by the term corrosion ? Write classification of corrosion in metals. How corrosion can be prevented ? 10

7. Explain the purpose and process of annealing. Discuss in detail the effect of alloying element in steel. 10

8. Define composites ? How are they classified ? What is the distinction between matrix and dispersed phases in a composite material ? 10

9. What are Miller Indices ? How are the Miller Indices for a crystallographic plane in a cubic unit cell determined ? Obtain the Miller Indices of a plane whose intercepts are a, b/2 and 3c on x, y and z-axes respectively in simple cubic unit cell. 10

10. Write short notes on **any two** of the following : 5x2=10
    (a) NDT
    (b) Normalizing
    (c) Smart materials and their applications.