3E1412

Roll No. : _____ Total Printed Pages : 3

3E1412

B. Tech. (Sem. III) (Main & Back) Examination, January - 2013
Production & Industrial Engg.
3PI2 Material Science & Engg. (Common for ME/AE)

Time : 3 Hours] [Total Marks : 80
[Min. Passing Marks : 24

*Attempt any **five** questions. Selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) What is meant by Crystal imperfections ? State the effect of their presence in materials. 8

(b) What do you understand by the term 'Crystal lattice' and how many types of this are found in metals ? 8

OR

1 (a) How are crystal planes identified by means of miller indices ? 6

(b) Draw the following planes and directions in an FCC structure :
(i) (010)
(ii) (111)
(iii) (011)
(iv) (001) 10

UNIT - II

2 What is slip ? On what crystallographic planes and in what directions it is likely to occur in BCC, FCC and HCP metals ? **16**

OR

2 (a) Explain the yield point phenomenon in materials in terms of dislocations. **8**

(b) Explain deformation of metals. How does it take place ? State its effect. **8**

UNIT - III

3 Draw the phase diagram for a binary system showing complete solubility in liquid and solid state. **16**

OR

3 Describe the process of austenite decomposition of alloyed steels with TTT diagrams. **16**

UNIT - IV

4 Explain briefly the following heat treatment operations :

(i) Annealing

(ii) Normalising

(iii) Tempering

(iv) Hardening

4×4=16

OR

4 (a) Explain the important processes of heat treatment of steel with illustrative examples. **8**

(b) Discuss the effect of heat treatment on the mechanical properties of steel. **8**

UNIT - V

5 Why is alloying done ? What are the effect of Si, Mn, Mo, Co and Ti as alloying element on properties of steel.

16

OR

5 Write short notes on :

(a) BIS standards

(b) Fiber reinforced plastic composites

(c) Classification of steels

5+6+5=16
