

3E1412

Roll No. : _____

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B.Tech. (Sem. III) (Main/Back) Examination, January - 2012
Production & Industrial Engg.
3PI2 Material Science & Engg. (Common for ME/AE)

Time : **3 Hours**][Total Marks : **80**
[Min. Passing Marks : **24****Instructions to Candidates :**

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 do you understand by crystallographic ? Notation of atomic planes ? Explain with the help of examples. 8

(b) Determine the density of BCC iron (Atomic mass = 55.847 g/mol). which has a lattice parameter of 0.2866 nm. 8

OR

1 (a) Explain with the neat sketches the various types of crystal imperfections. 10

(b) What is space lattice ? Draw the following plane and direction in the FCC structure (101), (112). 6



UNIT - II

- 2 (a) Explain the mechanism for dislocation in plastic deformation with neat sketches. 10
- (b) What is the change in property that occurs in recovery and recrystallisation ? 6

OR

- 2 (a) What are the various mechanism of plastic deformation ? 8
- (b) Write short note on mechanism of creep. 8

UNIT - III

- 3 Draw iron carbon equilibrium diagram and level the various phase, fields and temperatures. Discuss in brief different reactions that take place in the system. 16

OR

- 3 (a) Explain TTt curve. Explain critical cooling rate. 8
- (b) What is martensitic transformation ? Explain the characteristic of Martensite transformation. 8

UNIT - IV

- 4 (a) Explain flame hardening and carburizing. 8
- (b) Write short note on Heat treatment furnace. 8

OR



- 4 (a) Explain Rockwell hardness testing method. Write its advantages and limitations. 8
- (b) Explain tempering of steel and its effects. 8

UNIT - V

- 5 (a) Why is alloying done ? What are the effect of chromium and nickel as alloying element on properties of steel ? 8
- (b) What are bearing materials ? What are their composition ? Explain its applications. 8

OR

- 5 (a) Explain B's standard for classification of low and high alloy steels. 8
- (b) What is a composite ? What are the properties of composite materials depend upon ? 8

