

**337313 (37)**

**BE (3<sup>rd</sup> Semester)**

**Examination, April-May, 2014**

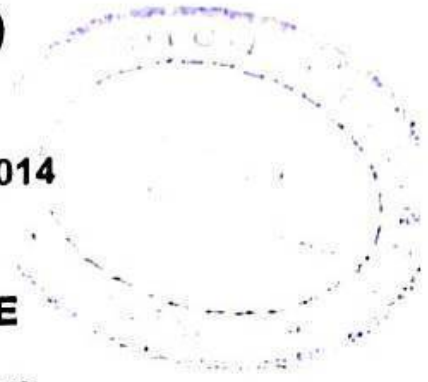
**Branch : Mechanical**

**MATERIAL SCIENCE**

**Time Allowed : Three Hours**

**Maximum Marks : 80**

**Minimum Pass Marks : 28**



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**Note :** All questions are compulsory. All questions carry equal marks. Draw neat and clean diagrams wherever necessary.

**Q. 1.** Solve any two parts from questions b, c and d.

- (a) Define unit cell and lattice constant.
- (b) Define atomic radius and find it for F.C.C. structure.

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- (c) Explain the x-ray diffraction method to determine crystal structure.
- (d) List out the salient features of Miller indices.

**Q. 2.** Attempt any two parts of the following :

- (a) Define strength, hardness, toughness, ductility and brittleness.
- (b) Compare slip and twinning.
- (c) What is strain hardening ?

**Q. 3.** Attempt any two parts of the following :

- (a) Draw the heating curve for pure-iron and discuss the different allotropic forms of pure iron and also the critical points.

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- (b) Draw the iron-iron carbide phase diagram and explain briefly the salient features.
- (c) Explain Gibbs phase rule.

Q. 4. Attempt any two parts of the following :

- (a) Explain austempering and martempering.
- (b) Explain normalising and nitriding.
- (c) Explain TTT curve for a specific composition of steel.

Q. 5. Give the composition, properties and uses of any four of the following :

- (a) Duralumin

(4)

- (b) Muntz metal
- (c) High speed steel (HSS)
- (d) Phosphor bronze
- (e) Grey cast iron
- (f) Stainless steel

