

3E1632

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B. Tech. III Semester (Main/Back) Examination-2014

Mechanical Engg.

3ME2A Material Science and Engg.

(Common to 3AN2, 3PI2A and 3AE2A)

Maximum Marks : 80

Min. Passing Marks : 24

Unit - I

1. a) What are crystal imperfections? (4)
- b) Differentiate edge dislocation and screw dislocation. (4)
- c) What are causes of crystal defects? (4)
- d) Differentiate elastic and plastic deformation. (4)

OR

1. a) Draw neat and labelled Iron - carbide equilibrium diagram. Explain invariant reactions occur in this diagram. (10)
- b) What is solid solution? (3)
- c) What is strengthening of metal? (3)

Unit - II

2. a) Explain the precipitation strengthening mechanism of aluminium alloys. (8)
- b) Discuss constituents, properties and applications of various copper alloys. (8)

OR

2. a) Write a short note on HSLA steel. (6)
- b) Discuss effect of various alloying element on the properties of carbon steels. (6)
- c) Write a short note on spheroidal cast iron. (4)

Unit - III

3. a) Differentiate hardness and hardenability. (4)
- b) Distinguish annealing and stress relief process. (6)
- c) Explain the following transformation
- i) Austenite to Bainite
- ii) Austenite to pearlite. (6)

OR

3. a) Discuss surface hardening. (8)
- b) What is TTT diagram? (4)
- c) Discuss Austeropering. (4)

Unit - IV

4. a) Differentiate various kinds of hardness test. (6)
- b) What is significance of fatigue test? (4)
- c) Discuss the stress - strain curve for a ductile material. (6)

OR

4. a) What are constituents, properties and engineering applications of PVC, PMMA, ABS, PTFE and PA? (10)
- b) Discuss impact test for the materials. (6)

5. a) What are the engineering Ceramics? (4)
- b) Discuss the properties and applications of Al_2O_3 , Si_3N_4 and s_iC . (6)
- c) Define composite materials. (2)
- d) Distinguish between fibre and particulate reinforced composite. (4)

OR

5. a) What are nano materials? (4)
- b) Explain with energy level graph quantum well, quantum wire and quantum dots. (8)
- c) Discuss various kind approaches for synthesis of nano materials. (4)