

R09

Code No: 09A30306

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year I Semester Examinations, May/June-2013

**Metallurgy and Material Science
(Common to ME, MCT, MIM, AME)**

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Describe and illustrate the solidification process of a pure metal.
- b) How does grain size influence the mechanical properties of materials? Describe any two methods of determination of grain size. [15]
- 2.a) What are the different solid solutions? Give examples.
- b) Discuss about the various types of electron compounds. [15]
- 3.a) Differentiate between the following:
 - i) Eutectic and eutectoid transformation
 - ii) Peritectic and peritectoid.
- b) What is Gibb's phase rule? Explain its importance. [15]
- 4.a) What are the advantages of steels over cast irons?
- b) List out the properties and applications of grey cast iron.
- c) What are the properties and applications of tool steels? [15]
- 5.a) Indicate the temperature range of the following heat treatments on Fe – Fe₃C equilibrium diagram (i) Annealing (ii) Normalizing (iii) Hardening (iv) Tempering.
- b) Distinguish between Induction Hardening and Flame hardening. [15]
6. Describe the structure and properties of
 - a) Duraluminium
 - b) ($\alpha + \beta$)Ti alloys
 - c) Aluminium bronzes
 - d) Muntz metal. [15]
- 7.a) Define ceramics. Classify them. Give some important applications of ceramics.
- b) Discuss about any two abrasive materials. [15]
8. Write short notes on the following:
 - a) Metal matrix composites
 - b) Nano materials
 - c) Cryogenic treatment. [15]

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