

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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