Code No: 09A30306 **R09**

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 – Fe_3C 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) (α +β)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]

---oo0oo---