

Code No: 53018

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD**B.Tech II Year I Semester Examinations, December-2014****METALLURGY AND MATERIAL SCIENCE****(Common to ME, MCT, AME)****Time: 3 hours****Max. Marks: 75**

Answer any five questions
All questions carry equal marks

1. Define and explain different type of bonds exist in solids with examples.
- 2.a) Briefly discuss about classification of solid solutions with examples.
b) Write short notes on the following:
 - i) Intermediate alloy phases
 - ii) Electron compounds.
- 3.a) State Gibb's Phase rule. Describe the Gibbs phase rule with suitable example.
b) What is an invariant reaction? Give an example.
c) Distinguish between peritectic reaction and eutectic reaction.
- 4.a) Distinguish between black heart malleable cast iron and white heart malleable cast iron with regard to microstructure, properties and applications.
b) Classify the steels. Describe the structure and properties of plain carbon steels.
- 5.a) What are the factors that affect the shape and position of the TTT diagram of an eutectoid steel?
b) What alloys are age-hardenable? Explain the important stages in Age-hardening process? Describe the mechanism of age-hardening.
6. Write short notes on the following:
 - a) Titanium and its alloys
 - b) Aluminium and its alloys.
- 7.a) Distinguish between cermets and abrasive materials.
b) What are nanomaterials? What is their importance?
8. Write short notes on the following:
 - a) Particle reinforced composites
 - b) Metal matrix composites.
