Code No: RT21031 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, May/June - 2016
METALLURGY AND MATERIAL SCIENCE
(Com. to ME, AME)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) What are the functions of alloying elements added to steel? (4M)
   b) What is an invariant reaction? (3M)
   c) Give the properties of Manganese steels (4M)
   d) Write short notes on Age hardening. (4M)
   e) Give the properties of bronzes. (4M)
   f) What is a composite material? (3M)

PART –B

2. a) Explain substitution and interstitial solid solutions with neat sketches. (8M)
   b) Why is alloying done? Explain why alloys find more applications than pure metals. (8M)

3. a) How do you classify the phase diagrams? What are objectives of phase diagram? (8M)
   b) List and explain three reactions present in the Fe – Fe3C equilibrium diagram. (8M)

4. a) Name the various types of cast iron and discuss their properties and uses. (8M)
   b) Explain the following types of malleable cast irons. (8M)
   i) Ferritic malleable cast iron ii) Pearlitic malleable cast iron.

5. a) What is annealing? Differentiate between Process annealing and recrystallization annealing. (8M)
   b) What information is made available by the isothermal transformation diagram (TTT-Curve) that was lacking in the iron-carbon equilibrium diagram? (8M)

6. a) Give a few applications where copper and its alloys are exclusively used. (8M)
   b) What are the advantages of aluminum alloys over other alloys? Where are they used? (8M)

7. a) Define the term ceramics. Give example for different traditional ceramics. (8M)
   b) Explain briefly the metal-matrix composites and Carbon-Carbon composites (8M)

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