

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)

