

Code No: RT21031

R13**SET - 1****II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017****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) Define covalent and metallic bonds in solids. (3M)
- b) Explain the importance of phase rule. (3M)
- c) What are the advantages of heat treatment of metals? (4M)
- d) Write the specific properties of nano materials. (4M)
- e) Name a few Titanium alloys. (4M)
- f) Differentiate between brass and bronze. (4M)

**PART -B**

2. a) Draw the close packed planes and directions in simple cube, BCC and FCC crystals and find out the Miller indices of the planes. (8M)
- b) Explain briefly the various types of crystal imperfections, with the help of neat sketches (8M)
3. a) Explain Hume - Rotherys rules for the formation of substitutional solid solutions (8M)
- b) Discuss the application of Hadfield manganese steels. (8M)
4. a) What is a eutectic temperature? Explain. (8M)
- b) Describe the allotropic transformations of iron and explain their important Applications (8M)
5. a) How do you carry out age hardening for Al alloys? (8M)
- b) Explain the properties of Cu-Al alloy and applications (8M)
6. Explain why the two phase titanium alloys are stronger than the single phase alpha alloys. (16M)
7. What are the various solid state compaction processes that are used for the production of composite materials? Explain them (16M)