

Code No: RT21031

R13**SET - 1****II B. Tech I Semester Supplementary Examinations, May/June - 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) Compare edge and screw dislocations. (3M)
- c) Explain the necessity of alloying. (4M)
- d) Discuss the importance of phases and phase diagrams (4M)
- e) Chromium alloying with iron promotes corrosion resistance to the resultant alloy? (4M)
- f) Why is 'Manganese bronze' a misnomer? (4M)

**PART -B**

2. a) Explain 'Comparison method' for estimation of grain size? (8M)
- b) Explain metallic bond in detail. What are its properties? (8M)
3. a) Differentiate between (8M)
  - i) Proeutectoid ferrite and eutectoid ferrite
  - ii) Hypoeutectic and Hyper eutectic white cast iron.
- b) Define and explain the structural phases. (8M)
  - i) Ferrite ii) Austenite iii) Cementite.
4. a) Discuss the properties of low alloy steels. (8M)
- b) Why are alloying elements added to steels? Give some examples of common alloying elements and their effect on the properties of steel. (8M)
5. a) What do you mean by tempering? How do you do for steel? (8M)
- b) Discuss Nitriding as a surface hardening mechanism. (8M)
6. a) What are the procedural steps in age-hardening of Cu-Al alloy? Explain. (8M)
- b) Discuss the important properties of Ti alloys. (8M)
7. a) Explain what is meant by chemical bonding and mechanical bonding as it relates to a fiber-matrix interface. (8M)
- b) Explain why it is necessary to thoroughly clean the surfaces of glass fibers to achieve a strong bond with epoxy matrix (8M)