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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
**(AUTONOMOUS)**  
**B.Tech I Year II Semester Supplementary Examinations February-2022**  
**MATERIALS ENGINEERING**  
**(Mechanical Engineering)**

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 Explain the effect of grain boundaries on the properties of alloys, also determine the grain size. 12M

OR

- 2 a Draw a neat sketch of FCC crystal structure and calculate its packing factor, coordinate number. 6M  
 b Draw a neat sketch of BCC crystal structure and calculate its packing factor, coordinate number. 6M

**UNIT-II**

- 3 a What is Phase? What are different types of phase diagram? 6M  
 b Define invariant reactions in phase Diagram with an example. 6M

OR

- 4 a Draw the Eutectoid system diagram. 4M  
 b Draw and explain the Fe-Fe<sub>3</sub>C phase diagram invariant reactions? 8M

**UNIT-III**

- 5 Explain the structure and properties of Titanium and its alloys? 12M

OR

- 6 a Explain the structure and properties of malleable cast iron. 5M  
 b Explain the structure and properties of Ductile cast iron. 7M

**UNIT-IV**

- 7 Write about Annealing, normalizing, Hardening. Draw and explain the structures. 12M

OR

- 8 What are TTT diagrams? How they prepared? What is their significance? 12M

**UNIT-V**

- 9 a What are glasses? How they manufacture? 6M  
 b Discuss about the Glass micro structure and properties. 6M

OR

- 10 What is the polymer? Explain the polymer matrix composite. 12M

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