

Code No.: ME302PC

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II-B.TECH-I-Semester End Examinations (Supply)- June- 2022
MATERIAL SCIENCE AND METALLURGY
(MECH)

[Time: 3 Hours]

[Max. Marks: 70]

- Note:** 1. Answer any FIVE questions. Each question carries 14 marks.
2. All questions carry equal marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

5X14=70

1. a) Distinguish between single crystal and poly crystal. Explain their effect on properties of materials. [7M]
b) How does grain size affect the mechanical properties? Explain. [7M]
2. a) Explain the governing rules for the formation of substitutional solid solutions. [7M]
b) Distinguish between electron compounds and intermetallic compounds with examples. [7M]
3. a) Define Hardenability and how it is measured? [7M]
b) Differentiate between Hardening and Tempering. [7M]
4. a) Explain carbonitriding? List its applications. [7M]
b) Draw the TTT diagrams and explain the different cooling rates. [7M]
5. a) Distinguish between α , β and $\alpha+\beta$ titanium alloys with respect to composition, microstructure, properties and applications. [7M]
b) Differentiate between white cast iron and malleable cast iron. [7M]
6. a) What important factors control the type of structure developed in ionic solids and covalent solids. Explain them. [7M]
b) What are the three most common intermediate alloy phases? Explain any two of them. [7M]
7. a) Draw and explain the phase diagram where two components are completely soluble in both liquid and solid state with suitable examples. [7M]
b) What is the effect of alloying elements on Fe-Fe₃C diagram? [7M]
8. a) Draw the cooling curves for 0.8%C steel and explain the phase transformations that occur on different cooling rates. [7M]
b) Explain spheroidising? List its applications. [7M]
