

CBCS SCHEME

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21MR33

Third Semester B.E. Degree Examination, Jan./Feb. 2023 Material Science

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. List the three primary classifications of solid materials. Briefly explain their features. (10 Marks)
b. Explain atomic bonding in detail. (10 Marks)

OR

- 2 a. Define atomic packing factor and calculate atomic packing factor for face centered cubic structure. (10 Marks)
b. What is imperfection? Define and explain two dimension defects. (10 Marks)

Module-2

- 3 a. Draw stress-strain diagrams showing ductile behavior of material and explain salient points. (10 Marks)
b. Define plastic deformation. Explain plastic deformation by slip and twinning. (10 Marks)

OR

- 4 a. Explain ductile fracture with suitable diagrams. (10 Marks)
b. Which are the factors affecting fatigue life? Explain. (10 Marks)

Module-3

- 5 a. What is solid solution? Explain different types of solid solution. (10 Marks)
b. Which are the factors affecting solid solubility? Explain. (10 Marks)

OR

- 6 a. Explain binary phase diagram. List the different types of binary phase diagrams. (10 Marks)
b. Differentiate between homogeneous and heterogeneous nucleation. (10 Marks)

Module-4

- 7 a. Explain carbon steels types and its applications. (10 Marks)
b. Explain properties and characteristics of aluminium alloys. (10 Marks)

OR

- 8 a. What is corrosion? Explain galvanic corrosion with sketch. (10 Marks)
b. Write a note on corrosion control methods. (10 Marks)

Module-5

- 9 a. Explain steps involved in constructing T-T-T diagram and draw the TTT curve for 0.8% C steel. (10 Marks)
b. Explain different types of annealing with sketch. (10 Marks)

OR

- 10 a. What is carburizing? Explain pack carburizing method. (10 Marks)
b. Explain with sketch nitriding process. Give two applications of nitriding process. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.