

CBCS SCHEME

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain the FCC structure. Find the APF from the basics. (10 Marks)
b. Differentiate between Edge and Screw dislocation. (10 Marks)

OR

- 2 a. Sketch the stress – strain diagram for a ductile materials indicating the salient points and explain the terms. (10 Marks)
b. What do you mean by linear and non – linear properties of material? Explain in brief any two properties. (10 Marks)

Module-2

- 3 a. Briefly explain the Mohr circle for plane stress. (10 Marks)
b. What is Stress Relaxation? Derive an expression for Stress Relaxation. (10 Marks)

OR

- 4 a. With a neat sketch, explain the stages in the formation of cup and cone fracture. (10 Marks)
b. Define Creep, with a typical curve. Explain different stages of creep. (10 Marks)

Module-3

- 5 a. Name the different types of Batteries used in vehicles and explain any two. (10 Marks)
b. List out the materials used for various components in batteries. (10 Marks)

OR

- 6 a. Explain briefly the fuel cell with a sketch. (10 Marks)
b. Describe the fundamentals of Electro Chemical Super Capacitors. (10 Marks)

Module-4

- 7 a. Explain the various annealing purpose and their purpose. (10 Marks)
b. With sketch, explain the working principle of Induction hardening. (10 Marks)

OR

- 8 a. Briefly explain the Structure, Properties, Composition and Application of Grey Cast Iron. (10 Marks)
b. Briefly explain types of Cast Iron and its applications. (10 Marks)

Module-5

- 9 a. List the non ferrous material and briefly explain any one method. (10 Marks)
b. Enumerate the different uses of Aluminum alloy and explain the advantages and disadvantages. (10 Marks)

OR

- 10 a. What is Composite Material? How is it classified? (10 Marks)
b. Briefly discuss the advantages and application of Composites. (10 Marks)

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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.