



## Third Semester B.E. Degree Examination, Dec.2023/Jan.2024 Material Science and Technology

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Draw and explain the stress-strain diagram for ductile and brittle materials and explain all the salient features. (10 Marks)
- b. Briefly explain the factors affecting the atomic diffusion. (10 Marks)

OR

- 2 a. Explain the mechanical properties of engineering materials in elastic region. (10 Marks)
- b. With the help of a creep curve, explain the 3 stages of creep. (10 Marks)

### Module-2

- 3 a. Briefly explain the TTT diagram for eutectoid steel for 0.8% C. (10 Marks)
- b. Explain normalizing and tempering. (10 Marks)

OR

- 4 a. Briefly explain the classification of steels. (10 Marks)
- b. Explain the properties, composition and application of  
i) Gray cast iron    ii) Medium carbon steels. (10 Marks)

### Module-3

- 5 a. Explain the difference between homogeneous and heterogeneous nucleation. (10 Marks)
- b. Define solid solution. Explain the types of solid solution. (10 Marks)

OR

- 6 a. Briefly explain TTT diagram for eutectoid transformation in Fe-C system. (10 Marks)
- b. Explain unary phase diagram and binary phase diagram. (10 Marks)

### Module-4

- 7 a. Define composite materials and explain the classification of composites. (10 Marks)
- b. With a neat sketch, explain filament winding process. (10 Marks)

OR

- 8 a. With a neat sketch, explain spray-up process. (10 Marks)
- b. With a neat sketch, explain pultrusion process. (10 Marks)

### Module-5

- 9 a. Define shape memory alloys. Explain the properties and application. (10 Marks)
- b. Briefly explain the types of smart materials. (10 Marks)

OR

- 10 a. Explain briefly electrostrictive and magnetorstrictive materials. Explain applications. (10 Marks)
- b. Write short note on:  
i) Piezoelectric materials  
ii) Accelerometers. (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.