

# CBCS SCHEME

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18ME34

## Third Semester B.E. Degree Examination, June/July 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. Draw the neat sketch of BCC and FCC structure and also find the APF of both the structure. (10 Marks)  
b. Explain point defects and Edge dislocation with necessary diagrams. (10 Marks)

OR

- 2 a. Explain linear and non-linear behavior of elastic properties of materials. (10 Marks)  
b. Explain slip and twinning. (05 Marks)  
c. Explain mechanisms of strengthening in metals. (05 Marks)

### Module-2

- 3 a. Draw the S – N diagram for fatigue failure also explain mechanism of fatigue failure. (10 Marks)  
b. Draw the creep curve and explain the different stages of creep curve. (10 Marks)

OR

- 4 a. Explain the rule of Hume – Rothery to form the substitutional solid solution. (10 Marks)  
b. Draw the Iron carbon diagram and mark all the phases on it also explain ferrite and austenite structure. (10 Marks)

### Module-3

- 5 a. Draw the T – T – T diagram and superimpose CCT diagram on it. Explain these two diagrams importance. (10 Marks)  
b. Explain Annealing, normalizing and tempering process. (10 Marks)

OR

- 6 a. Explain austempering and martempering processes with neat diagrams. (10 Marks)  
b. Explain carburizing, cyaniding and nitriding processes (10 Marks)

### Module-4

- 7 a. Classify the composite based on matrix and reinforcement. Explain brief about the matrix and reinforcement. (10 Marks)  
b. Any two methods of production of PMCs. (10 Marks)

OR

- 8 a. Any two methods of production CMCs. (10 Marks)  
b. State the advantage and applications of composites. (10 Marks)

### Module-5

- 9 a. Explain any two processing of plastics. (10 Marks)  
b. Write note on thermal and optical material - IS (10 Marks)

OR

- 10 a. Explain shape memory alloys and fiber optic materials. (10 Marks)  
b. Explain any two ceramics processing methods. (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.