

# CBCS SCHEME

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18MAR31

## Third Semester M.Tech. Degree Examination, Jan./Feb. 2021 Advanced Materials and Processing

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Broadly classify the ferrous and non ferrous metals, along with its characteristics and application. (10 Marks)
- b. Explain the classification of composites and also write a short note on each of the classification. (10 Marks)

OR

- 2 a. Explain the orientation of the atoms in BCC and FCC crystal structure of the metal with a simple sketch. (10 Marks)
- b. How the mechanism of strengthening in metals is done using Grain size reduction mechanism and solid solution strengthening mechanism? (10 Marks)

### Module-2

- 3 a. With a neat sketch, explain the Iron-Iron carbide phase diagram. (10 Marks)
- b. Explain the following given methods of heat treatment for steels:  
i) Normalizing ii) Hardening iii) Annealing  
Also show it in equilibrium diagram. (10 Marks)

OR

- 4 a. With the help of a neat sketch, explain the process of age hardening of non-ferrous alloys. (10 Marks)
- b. Write the properties and characteristics of the following non-ferrous alloys:  
i) Cu-Zinc alloy ii) Cu-Tin alloy iii) Al-lithium alloy. (10 Marks)

### Module-3

- 5 a. Differentiate between thermosetting and thermoplastic polymers. Also mention the factors which influence the mechanical properties of the semicrystalline polymers. (10 Marks)
- b. Explain the following 2 types of mechanical behavior of the polymers:  
i) Stress-strain behavior  
ii) Visco elastic deformation. (10 Marks)

OR

- 6 a. Mention different types of the glass ceramics, its characteristics and applications. (10 Marks)
- b. Write a note on different types of refractories. (10 Marks)

### Module-4

- 7 a. Write the composition, application, advantages and disadvantages of the following types of the composition i) Metal matrix composites ii) Ceramic matrix composites. (10 Marks)
- b. Briefly explain the influence of fiber length and fiber orientation on the mechanical properties of the composites. (10 Marks)

OR

- 8 a. Write a short note on the following 2 types of large particle composites:  
i) Concrete ii) Portland cement concrete. (10 Marks)
- b. Explain any 2 types of polymers matrix composites. (10 Marks)

**Module-5**

- 9 With a neat sketches, explain the method of production of composites using:  
a. Hand layup method (10 Marks)
- b. Autoclave moulding method. (10 Marks)

OR

- 10 Explain the following 2 methods of composites production, with a neat sketch:  
a. Filament winding (10 Marks)
- b. Pultrusion method. (10 Marks)

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