

# CBCS SCHEME

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17NT42

## Fourth Semester B.E. Degree Examination, June/July 2019 Material Science and Engineering

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Write briefly about classification of materials based on functionality. (10 Marks)  
b. Discuss about i) Materials design and selection ii) The structure of materials. (10 Marks)

OR

- 2 a. Explain the various properties of materials. (10 Marks)  
b. Describe about the electronic structure of the atom. (10 Marks)

### Module-2

- 3 a. Define crystalline solids. Differentiate between crystalline and amorphous solids. (10 Marks)  
b. Draw the atomic plane for miller indices i) 111 ii) 101. (10 Marks)

OR

- 4 a. Explain how high density planes have influence on the behaviour of the crystal. (10 Marks)  
b. Sketch and represent the numbers of atoms in BCC and FCC crystals. (10 Marks)

### Module-3

- 5 a. Explain Photon diffusion and four main kinds of passive transport. (10 Marks)  
b. Describe about the factors affecting diffusion. (10 Marks)

OR

- 6 a. Describe the following: i) Atomic diffusion ii) Eddy diffusion iii) Effusion and Graham's law (12 Marks)  
b. Briefly about different material processing methods. (08 Marks)

### Module-4

- 7 a. Discuss types of liquid crystal displays along with their applications. (12 Marks)  
b. Explain about applications of chiral liquid crystals in thermography. (08 Marks)

OR

- 8 a. Explain about classification of liquid crystals. (06 Marks)  
b. Briefly about molecular ordering in Nematic and Smectic liquid crystals. (14 Marks)

### Module-5

- 9 a. Write briefly about piezoelectric materials and applications. (10 Marks)  
b. Give the brief classification of smart materials with examples. (10 Marks)

OR

- 10 a. Explain in brief about shape memory alloys and applications. (10 Marks)  
b. Describe about ferro fluids and their synthesis and applications. (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.