

# CBCS Scheme

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15NT32

## Third Semester B.E. Degree Examination, Dec.2017/Jan.2018 Basic of Material Science

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. What are nanomaterials? Discuss about the classification of nanomaterials based on dimensions with suitable examples. (08 Marks)  
b. Discuss in detail about importance and applications of advanced ceramic materials. (08 Marks)

OR

- 2 Write note on the following :  
a. Shape memory materials (04 Marks)  
b. Rheological fluids (04 Marks)  
c. Ferroelectric materials (04 Marks)  
d. Piezoelectric materials (04 Marks)

### Module-2

- 3 a. What is electrical resistivity? Explain in detail about any one method to measure the electrical resistivity. (10 Marks)  
b. What do you mean by drift velocity and electron mobility? Discuss the relationship between them. (06 Marks)

OR

- 4 a. With the help of energy band diagram, discuss the electrical properties of solids. (08 Marks)  
b. Write a note on Hall effect. (04 Marks)  
c. Distinguish between junction transistor and MOSFET. (04 Marks)

### Module-3

- 5 a. What is absorption spectroscopy? How measuring absorbance of a material used to study the optical property of the materials. (10 Marks)  
b. What is birefringence? Write note birefringent materials. (06 Marks)

OR

- 6 a. What are photonic materials? Write a note on applications of photonic materials. (08 Marks)  
b. Write a note on liquid crystals and their application in LCD. (08 Marks)

### Module-4

- 7 a. What are specific, molar and volume heat capacities? Discuss the factors affecting specific heat capacity. (06 Marks)  
b. What are magnetic materials? Discuss the classification of magnetic materials. (10 Marks)

**OR**

- 8 a. What do you mean by thermal expansion? Discuss the factors affecting thermal expansion and applications of thermal expansion. (10 Marks)  
b. Write a note on hard and soft magnetic materials. (06 Marks)

**Module-5**

- 9 a. Write a note on Scottky defect Frankel defect and impurity defects in crystals with neat diagram. (08 Marks)  
b. What is UTM? Discuss about the components of UTM with neat diagram. (08 Marks)

**OR**

- 10 a. Write a note on line defects and surface imperfections. (10 Marks)  
b. What is hardness? Discuss in detail about Rockwell hardness test. (06 Marks)

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