

CBCS Scheme

USN

15AU32

Third Semester B.E. Degree Examination, June/July 2017 Material Science and Metallurgy

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define Atomic packing factor. Find Atomic packing factor for F.C.C structure. (08 Marks)
b. Clearly explain slip and twinning. (08 Marks)

OR

- 2 a. Clearly explain any three point defects. (07 Marks)
b. Define True stress and Engineering stress. (02 Marks)
c. Sketch stress strain diagram for a ductile material and show on the curve different salient points. (07 Marks)

Module-2

- 3 a. With the help of a graph, explain three stages of creep. (08 Marks)
b. Write a note on stress relaxation. (04 Marks)
c. Explain Fatigue testing in brief. (04 Marks)

OR

- 4 a. What is Fatigue? Why it is dangerous? (02 Marks)
b. Explain different types of fatigue loading. (09 Marks)
c. Explain Ductile fracture. (05 Marks)

Module-3

- 5 a. Explain Homogenous and Heterogeneous nucleation. (08 Marks)
b. Explain Eutectic type phase diagram. (08 Marks)

OR

- 6 a. Explain Peritectic and Peritectoid transformations. (08 Marks)
b. With the help of a cooling curve, explain the solidification of very very pure metal. (08 Marks)

Module-4

- 7 a. Explain the construction of TTT curves. (08 Marks)
b. Explain Martempering and Austempering. (08 Marks)

OR

- 8 a. Explain Pack carburizing. (08 Marks)
b. List the properties, composition and uses of Grey cast iron and SG iron. (06 Marks)
c. List any four uses of Bronze. (02 Marks)

Module-5

- 9 a. List the functions of a matrix material in composites. (03 Marks)
b. Write a note on non destructive testing and list its advantages and limitations. (08 Marks)
c. Explain Hand lay – up process of production of FRP. (05 Marks)

OR

- 10 a. Write a note on Piezo Electric material and Fibre optic materials. (08 Marks)
b. Write a note on Biological applications of Smart material. (04 Marks)
c. List advantages and limitations of composite materials. (04 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagram/ stress-strain curve, creep curve, phase diagram, etc. as required.