



CBCS SCHEME

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Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Material Science and Metallurgy

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Explain : i) Co-ordination number ii) Atomic packing factor. (08 Marks)
b. Explain various factors that influence diffusion in metals. (08 Marks)

OR

- 2 a. State Fick's law and show how it applies to the diffusion which take place in solid solution. (08 Marks)
b. Sketch and explain stress-strain curve for ductile materials and marks all relevant points. (08 Marks)

Module-2

- 3 a. Distinguish between brittle and ductile fracture with graphical representation. (08 Marks)
b. Draw and explain S-N curve for steel and Aluminum alloy. (08 Marks)

OR

- 4 a. Define the term fatigue limit as applied to a fatigue test on a mild steel specimen. In what way may this properties be affected by the environment of the specimen. (08 Marks)
b. Explain the creep behavior of mild steel with the help of a three stage creep curve. (08 Marks)

Module-3

- 5 a. State and discuss the Gibbs phase rule and its applications. (08 Marks)
b. State and explain the lever rule with examples. (08 Marks)

OR

- 6 a. Explain Hume-Rothery rules for solid solution behaviours. (06 Marks)
b. Draw the phase diagram for eutectic and eutectoid. (06 Marks)
c. Illustrate the effects of allowing on the eutectoid temperature of steels. (04 Marks)

Module-4

- 7 a. Explain case carburization of surface treatment. (06 Marks)
b. Differentiate between austempering and martempering of steels. (06 Marks)
c. What are the different types of cast iron? (04 Marks)

OR

- 8 a. Write a composition, properties and application of Grey cast iron and S.G iron. (08 Marks)
b. Differentiate brasses and bronzes. (04 Marks)
c. Show schematically the microstructure of white iron and its compositions. (04 Marks)

Module-5

- 9 a. With a neat sketch, explain any one method of production of fiber reinforced plastic. (08 Marks)
b. Briefly discuss the advantages and applications of metal matrix composites and polymer matrix composites. (08 Marks)

OR

- 10 a. Write a short note on shape memory alloys. (08 Marks)
b. Discuss in brief, applications of smart materials in various fields. (08 Marks)

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.