CBCS SCHEME

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18AU33

Third Semester B.E. Degree Examination, July/August 2022
Material Science and Metallurgy

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. With sketch explain B.C.C and F.C.C crystalline structures. **(10 Marks)**
b. With sketches explain the various point defects. **(10 Marks)**

OR

2 a. Compare edge and screw dislocations. **(14 Marks)**
b. State and explain I and II Fick's Law of diffusion. **(06 Marks)**

Module-2

3 a. With sketches, explain the various stages involved in a ductile fracture. **(15 Marks)**
b. Mention the factors affecting fatigue. **(05 Marks)**

OR

4 a. With typical creep curve, explain the various stages of creep. **(10 Marks)**
b. Explain the factors that affect fatigue life of a material. **(10 Marks)**

Module-3

5 a. Explain the two stages of solidification of a metal or alloy. **(10 Marks)**
b. Make a comparison between homogeneous and heterogeneous Nucleation's. **(10 Marks)**

OR

6 a. State and explain in HUME ROTHERY'S ROLES that govern the formation of substitutional solid solution. **(10 Marks)**
b. Explain with sketches Eutectic and peritectic reactions pertaining to phase transformation. **(10 Marks)**

Module-4

7 a. State the objective of heat treatment. **(08 Marks)**
b. Make a comparison between Normalising and Annealing. **(12 Marks)**

OR

8 a. With sketch, explain the working principle of induction hardening. **(10 Marks)**
b. Define age hardening. Explain the three steps involved in age hardening. **(10 Marks)**

Module-5

9 a. Define critical cooling rate, explain the factor that affects critical cooling rate. **(10 Marks)**
b. With diagram, describe the hand layup process of fabricating a composite. **(10 Marks)**

OR

10 a. Mention the roles of matrix and Reinforcements in composite materials. **(10 Marks)**
b. Define Brass. State its important properties. **(10 Marks)**

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