CBCS SCHEME

USN | | | | | | | | | | |

17ME32

Third Semester B.E. Degree Examination, June/July 2024
Material Science

Time: 3 hrs. Max. Marks:100

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

Module-1

1 a. Define APF and coordination number. Calculate the APF for HCP structure. **(08 Marks)**
b. Differentiate Edge dislocation and screw dislocation. **(05 Marks)**
c. State and explain Fick's I and II law diffusion. **(07 Marks)**

OR

2 a. List the mechanical properties in plastic range. Explain them briefly. **(08 Marks)**
b. With neat sketch, explain S-N diagram and creep curve. **(12 Marks)**

Module-2

3 a. With a neat sketch, explain Iron Carbon diagram. **(10 Marks)**
b. What is Solidification? Explain the Mechanism of Solidification. **(10 Marks)**

OR

4 a. Explain the application of Gibb's phase rule using binary phase diagram. **(10 Marks)**
b. Explain Hume – Rothery's Rules for Solid Solubility. **(05 Marks)**
c. Write a note on Solidification of Pure metals. **(05 Marks)**

Module-3

5 a. Draw the T-T-T diagram with the help of transformation curves. Explain the structure of Martensite, Bainite and Retained Austenite. **(12 Marks)**
b. Explain Annealing and normalizing with the help of necessary graphs and diagrams. **(08 Marks)**

OR

6 a. Explain in detail the surface hardening like, carburizing, cyaniding, nitriding flame hardening and induction hardening. **(16 Marks)**
b. Explain the concept of Austempering and Martempering. **(04 Marks)**

Module-4

7 a. Define ceramics and what are its types? **(06 Marks)**
b. Enumerate Electrical and Mechanical properties of ceramics. **(08 Marks)**
c. Write the uses of plastics in the various field of engineering. **(06 Marks)**

OR

8 a. Differentiate the thermo plastics and thermo setting plastics. **(05 Marks)**

b. With a neat sketch explain the processing of plastics using injection moulding method. **(10 Marks)**

c. Write a note on properties and applications of smart materials. **(05 Marks)**

Module-5

9 a. Write note on matrix materials and reinforcement materials. **(10 Marks)**

b. Write advantages, limitations and applications of composites. **(10 Marks)**

OR

10 a. Write note on any two polymer matrix composites production methods with neat diagrams. **(12 Marks)**

b. Derive the equation to calculate Young's modulus in iso-strain condition. **(08 Marks)**

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