CBCS SCHEME

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

17AU32

Third Semester B.E. Degree Examination, June/July 2019
Material Science and Metallurgy

Time: 3 hrs. Max. Marks: 100

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

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.

Module-1

1 a. Define APF. Calculate the atomic packing factor of FCC crystal lattice. **(08 Marks)**
b. Classify Crystal imperfection. Explain the point defects in details. **(07 Marks)**
c. State and explain Flicks I law of diffusion. **(05 Marks)**

OR

2 a. Define Engineering stress and Engineering strain and obtain a relationship between True strain and Engineering strain. **(12 Marks)**
b. Define i) Toughness ii) Resilience iii) Stiffness iv) Young's modules. **(08 Marks)**

Module-2

3 a. Explain Cup and Cone fracture, with neat sketch. **(08 Marks)**
b. Define Creep, with a typical curve. Explain different stages of creep. **(08 Marks)**
c. Write a note on ductile fracture. **(04 Marks)**

OR

4 a. Draw S – N diagram for mild – steel and aluminum. Explain RR Moore fatigue bending test, with neat sketch. **(12 Marks)**
b. Explain types of Fatigue loading. **(08 Marks)**

Module-3

5 a. Explain Hume – Rothary rules for solid solution behaviour. **(08 Marks)**
b. Explain the homogenous nucleation. Discuss the critical radius of the nuclai. **(12 Marks)**

OR

6 a. Construct a phase diagram for two metals completely soluble in liquid but partially soluble in solid state. **(10 Marks)**
b. Draw diagram for Eutectic and Eutectoid reaction. Label the details. Explain. **(10 Marks)**

Module-4

7 a. What is TTT diagram? Explain with a neat diagram of martonsic transformation of austenite. **(08 Marks)**
b. Explain Carbursing and flame hardening in brief. **(08 Marks)**
c. Explain reasons for heat – treatment of metals. **(04 Marks)**

OR

8 a. What is meant by SG Iron? Explain the structure, composition , properties of SG Iron. **(12 Marks)**
b. Write a note on Alluminium alloys. **(08 Marks)**

Module-5

9 a. With a neat sketch, explain any one method for production of FRP. **(12 Marks)**
b. Discuss the advantages and application of MMC's. **(08 Marks)**

OR

10 a. Write a note on Smart Materials. **(06 Marks)**
b. Write a note on Shape Memory alloys. **(06 Marks)**
c. Write a different non- destructive testing methods and enumerate its applications. **(08 Marks)**

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