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Third Semester B.E. Degree Examination, Dec.2018/Jan.2019 Material Science and Technology

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. With stress – strain diagram, explain the ductile and brittle behaviour of mild steel materials. (08 Marks)
b. Explain the behaviour of mild steel and aluminium by S – N diagram for fatigue loading. (08 Marks)

OR

- 2 a. List and explain factor affecting diffusion. (08 Marks)
b. What is creep? Explain 3 stages of creep with appropriate figure. (08 Marks)

Module-2

- 3 a. Identify the different phases of 0.8%C eutectoid steel by TTT diagram. (08 Marks)
b. Write note on aluminium alloys. (08 Marks)

OR

- 4 a. Explain age hardening of aluminium and copper alloys. (08 Marks)
b. Write a note on Ferrous and non ferrous materials. (08 Marks)

Module-3

- 5 a. With neat figure explain types of cast metal structures. (04 Marks)
b. 2 metals A and B have their melting points at 600°C and 400°C respectively. These metals do not form any compound (or) intermediate phase. The maximum solubility in each other is 4% which remains the same unit 0°C. An eutectic reaction takes place between 65% A and 35%B at 300°C.
i) Draw the phase diagram and A – B and label all the important points and fields.
ii) Find the temperature at which a 20% A – 80% B alloy starts and completes solidification.
iii) Find the temperature at which the same alloy is composed of 50% liquid and 50% solid. (12 Marks)

OR

- 6 a. Explain mechanism of solidification. (08 Marks)
b. What is solid solution? Explain types of solid solution with figure. (08 Marks)

Module-4

- 7 a. List advantages, disadvantages and application of composite materials. (08 Marks)
b. With neat figure explain pressure bag and vaccum bag moulding. (08 Marks)

OR

- 8 a. Explain the types of matrix materials used for different types of composites. (08 Marks)
b. Explain the neat figure injection molding process. (08 Marks)

Module-5

- 9 Write note on : a. Fiber – optic sensors b. Shape memory materials
c. Magnetostrictive materials d. Pressure sensors (16 Marks)

OR

- 10 a. What is piezoelectric material? Explain working principle, characteristics of piezoelectric materials. (08 Marks)
b. Explain in detail force sensors and torque sensors. (08 Marks)
