USN

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Draw the stress – strain diagram for ductile material. Explain the salient features of Yield strength , Ultimate tensile strength. **(08 Marks)**

   b. State the Fick's laws of Diffusion. Derive $J = \dfrac{-Ddc}{dx}$. **(08 Marks)**

OR

2 a. What is Creep? Draw creep curve. Explain the stages of creep. **(08 Marks)**

   b. What is Fatigue? Mention the types of Fatigue loading with figures. **(08 Marks)**

Module-2

3 a. What is TTT curves? What is the difference between TTT curves and CCT curves? **(08 Marks)**

   b. What is Annealing? Explain Isothermal Annealing. Mention the purpose of annealing. **(08 Marks)**

OR

4 a. What is Cast Iron? Mention the types of iron. Explain SG Iron. **(08 Marks)**

   b. What is Brass and Bronze? Mention the composition and composition of Al – Zn alloys Application. **(08 Marks)**

Module-3

5 a. What is Solidification? Explain the mechanism of solidification of pure metal with coding curves. **(08 Marks)**

   b. What are the difference between Homogeneous nucleation and Heterogeneous nucleation? **(08 Marks)**

OR

6 a. Explain the Hume – Rothery Rules for substitutional solid solution. **(08 Marks)**

   b. What is Gibbs phase rule? Explain the basic terms. **(04 Marks)**

   c. Explain the Dendritic growth with figure. **(04 Marks)**

Module-4

7 a. What is Composite Material? Mention the classification of composite material. Explain any one. **(08 Marks)**

   b. What is FRP? Draw a neat sketch of spray up process and explain. **(08 Marks)**

OR

8 a. What is MMC? Explain the Diffusion bending, with neat figure. **(08 Marks)**

   b. What is Injection Moulding? Draw a neat sketch of injection moulding and explain. **(08 Marks)**

Module-5

9 a. What is Magnetostrictive materials? Explain. (04 Marks)
   b. What is Shape memory alloys? Explain how does it work. (04 Marks)
   c. What is Magnetoreheological Fluids? Explain with figure. (08 Marks)

OR

10 a. What is Smart Sensors? Explain. (04 Marks)
   b. What is an Accelerometer? Explain any one type. (04 Marks)
   c. What is Load cell? Explain. (04 Marks)
   d. What is Microphone? Explain any one with types. (04 Marks)

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