

Define Annealing. Explain various Annealing processes. b.

OR

- What is age hardening? Explain age hardening of 4% Cu alloy with its microstructure, with 6 a. sketch. (10 Marks)
 - Explain the composition, structure and properties and applications of 3 types of cast Iron. b.

(10 Marks)

Module-4

- Under Iso-strain condition derive an expression for Young's modulus of fiber reinforced a. composites. List the advantages and applications of composite materials. (08 Marks) (08 Marks)
 - Explain Resin transfer moulding process. b.
 - Calculate the tensile modulus of elasticity of an unidirectional carbon fiber material which c. contains 62% by volume of carbon fibers in ISO - stress and ISO - strain condition. $E_{C} = 3.86 \times 10^{4} \text{ Kgf/mm}^{2}$; $E_{eposy} = 428 \times 10^{2} \text{ Kgf/mm}^{2}$. (04 Marks)

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(04 Marks)

- Calculate the modulus of elasticity, tensile strength, and the fraction of the load carried by a the fiber for the following composite material stressed under iso-strain condition. The composite consists of a continuous glass fiber reinforced epoxy resin produced by using 60% by volume of E-glass (E = 72400×10^6 N/m²), tensile strength of 2400×10^6 N/m² and a hardened epoxy resin with a modulus of elasticity of $3100 \times 10^6 \text{N/m}^2$ and a tensile strength of 60×10^6 N/m². Also find the modulus of elasticity of the composite when stressed under iso stress condition. (08 Marks) (08 Marks)
- b. With a neat sketch, explain pultrusion process.
- Discuss the role of composite materials in technological development. C.

Module-5

- What are ceramic materials? Write chemical, optical, thermal and mechanical properties of a. ceramics. (10 Marks) Discuss about mechanical behavior of plastics. (04 Marks) b. (06 Marks)
 - Explain Injection moulding technique. c.

OR

- What is NiTinol? How is it different from its alloying materials? 10 (05 Marks) a. Explain the following : b.
 - Materials used in Human implants i)
 - ii) Fiber optic materials

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iii) Pseudoelasticity.

(15 Marks)

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