Code.No: 07A42103 | R07 | SET-4

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
II B.TECH II SEM–REGULAR/SUPPLEMENTARY EXAMINATIONS MAY - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. How are the structural components of an aircraft manufactured with nickel base super alloys? Describe hot isostatic pressing of nickel based alloy powders. [16]

2. a) How Aluminum alloys are welded? What are the difficulties that have encountered in welding of aluminum alloys?
   b) Give the composition of any two high temperature resistance Aluminum alloys. Explain their applications. [8+8]

3. Discuss the following:
   i) Filament winding method
   ii) Reaction injection moulding
   iii) Cladding. [4+6+6]

4. The composite consists of a continuous glass-fiber reinforced epoxy resin produced by using 60% by volume of E- glass fiber having a modulus of elasticity of $E_f = 10.5 \times 10^6$ Psi and a tensile strength of 350,000 Psi and a hardened epoxy resin with a modulus of $E_m = 0.45 \times 10^6$ Psi and a tensile strength of 9000 Psi, calculate:
   i) The modulus of elasticity
   ii) Tensile strength and
   iii) Fraction of the lead carried by the fiber of the above composite material stressed under isostrain condition. [16]

5. a) How the building block method is used in the finite element analysis of composites?
   b) How the quasi isotropic and balanced laminates influence mechanical and metallurgical properties of the composites? [8+8]

6. a) How the large fiber glass components are made by contact mould process?
   b) Differentiate between compression molding and injection molding process? [8+8]

7. a) How the internal defects of metals and composites can be found by x – ray testing?
   b) What are the advantages of gamma – ray testing over X – ray technique and explain the method of finding the damage of cells and particulates of composites? [10+6]

8. a) Describe wire reinforced super alloy composites and mention their composition, properties and applications?
   b) What are the functions of a matrix in composite materials? [10+6]

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