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Code.No: 07A42103 | R07 | SET-1

II B.TECH – II SEM EXAMINATIONS, DECEMBER - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1. What are the Mechanical properties of engineering materials, Explain any eight of them. [16]

2.a) What types of alloys are included under the general heading light alloys? List the uses of high purity and commercial pure aluminum.
b) What alloying elements are commonly used in commercial aluminum alloys? Explain their effect? [6+10]

3. Explain ply orientations and its influence in composite materials? [16]

4. Explain experimental determination of strength and stiffness for an orthotropic lamina. [16]

5. Explain bounding techniques of elasticity of a Lamina. [16]

6. Explain Filament winding with the help of neat sketches and also explain different mandrels and mandrel materials used. [16]

7. Explain the following:
a) Thermography
b) Holography
c) Acoustic Emission [5+5+6]

8.a) Explain the Applications of composites in military aircrafts.
b) Explain the selection of super alloys for supersonic vehicles. [8+8]

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II B.TECH – II SEM EXAMINATIONS, DECEMBER - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1. Explain advantages and disadvantages of composites. [16]

2.a) Explain briefly 'AAA' classification of wrought aluminum alloys.
b) Discuss any two important aluminum alloys, giving its composition, heat treatment, structure and properties. [6+10]

3. Explain the following:
a) Ant-symmetric laminates.
b) Angle ply laminates
c) Cross- ply laminates
d) Symmetric lay-up code [4+4+4+4]

4. Derive equations for stress-strain relations for plane stress in an orthotropic material. [16]

5. Determine E_1 and E_2 of the composite material by mechanics of materials approach. [16]

6. Explain advantages and disadvantages of Filament winding and also explain closed mold processes with the help of neat sketches. [16]

7. Explain the following
a) Ultrasonic testing
b) Laser shearography / holography [10+6]

8. How you will select the materials for aircraft construction with environmental and manufacturing considerations. [16]

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II B.TECH – II SEM EXAMINATIONS, DECEMBER - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) Explain the classifications of engineering materials.
b) Explain the properties of engineering materials in brief. [8+8]

2.a) Write the history and development of aluminum alloys.
b) Describe the extraction process of pure aluminum from its ore. [6+10]

3. Explain different aerospace applications of composite materials. [16]

4. Explain Biaxial strength criteria for an orthotropic Lamina. [16]

5. Explain Micromechanics of composite material with the following two basic approaches
a) Mechanics of material
b) Elasticity [8+8]

6. Explain any two open mold processes with the help of neat sketches. [16]

7. Explain the following
a) Damage Tolerance
i) Safety ii) Structural Efficiency iii) Economic Considerations
b) Damage tolerance philosophy [8+8]

8. Explain in brief, the different applications of composites in aircraft industry. [16]

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

II B.TECH – II SEM EXAMINATIONS, DECEMBER - 2010
AEROSPACE MATERIALS AND COMPOSITES
(AERONAUTICAL ENGINEERING)

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

Answer any FIVE questions
All questions carry equal marks
- - -

1. Explain Mechanical behavior of composite material and compare with other materials. [16]

2. Discuss the following strengthening mechanisms to improve the mechanical properties of aluminum alloys:
   a) Solid solution strengthening
   b) Responding to precipitation hardening
   c) Strain hardening. [4+9+3]

3. Explain how and why the composite are using to fabricate aircraft structures composites. [16]

4. Explain the following theories for orthotropic Lamina
   a) Maximum stress failure criterion
   b) Maximum strain failure criterion [8+8]

5. Determine Poisson's Ratio V_{12} and shear modulus G_{12} of a Lamina [16]

6. Explain any two closed mold processes with the help of neat sketches. [16]

7. Explain non-destruction inspection techniques in brief: [16]

8. Explain the applications of composites in civil aircraft industry. [16]

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