

Code: 9A03807

1

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

**COMPOSITE MATERIALS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions.  
All questions carry equal marks.

\*\*\*\*\*

- 1 Discuss the classification of composite materials. Give examples for each class.
- 2 Discuss about the various reinforcements used in composites. What are the advantages of ceramics over metal as fibers?
- 3 Discuss about the following:
  - (a) Metal matrix composites.
  - (b) Polymer matrix composites.
- 4 Explain about Pultrusion method and draw neat schematic diagram.
- 5 What is Tsai-Wu theory? Explain about the theory.
- 6 Discuss about the Hygrothermal stress-strain relationship for a unidirectional lamina.
- 7 Explain about in-plane and flexural modules of laminate.
- 8 What are the various design issues in mechanical design of laminates?

\*\*\*\*\*

Code: 9A03807

2

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

**COMPOSITE MATERIALS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions.  
All questions carry equal marks.

\*\*\*\*\*

- 1 "Composite materials are most suitable materials for aerospace and automobile industries". Explain the statement giving examples.
- 2 Discuss about the composition, advantages and salient features of metal matrix composites.
- 3 Write short notes on the following:
  - (a) Kevlar.
  - (b) Particular composites.
- 4 Explain the filament winding method for manufacturing composites with neat diagram.
- 5 Derive an equation for Hooke's law for two dimensional lamina.
- 6 Explain about Tsai failure theory.
- 7 Discuss about the following:
  - (a) Semi-empirical models.
  - (b) Halpin-Tsai equation.
- 8 Explain the phenomenon of warpage of laminate.

\*\*\*\*\*

Code: 9A03807

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

**COMPOSITE MATERIALS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions.  
All questions carry equal marks.

\*\*\*\*\*

- 1 How the composite are classified? Discuss about the various types with respect to advantages and applications.
- 2 Distinguish and discuss about the fiber reinforced composites and nature made composites.
- 3 Explain the following:
  - (a) Fiber glass.
  - (b) Kevlar.
  - (c) Carbon fibres.
- 4 Explain about the autoclave method of manufacturing composites.
- 5 Define the following material properties and mention independent elastic constants, (a) Anisotropic (b) Mono clinic (c) Transversely isotropic.
- 6 Discuss about Hooke's law for a two-dimensional angle lamina.
- 7 Consider a composite consists of fiber and matrix find (a) volume fractions (b) mass-fractions. Assume  $V_f$ ,  $V_m$ ,  $V_f$ ,  $V_m$ ,  $W_f$  and  $W_m$  have their usual meaning.
- 8 Explain about stress-strain relationship for a laminate.

\*\*\*\*\*

Code: 9A03807

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013

**COMPOSITE MATERIALS**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions.  
All questions carry equal marks.

\*\*\*\*\*

- 1 Discuss the role of composite materials in present-day automobile and aerospace industries. Explain with suitable examples.
- 2 Explain the composition, advantages and salient features of fiber reinforced composites.
- 3 Explain the following:
  - (a) Particulate composite.
  - (b) Polymer composite.
- 4 Explain the compression moulding methods with neat diagrams.
- 5 Explain the relationship of compliance and stiffness matrix to engineering constants of a lamina.
- 6 Write short notes on the following:
  - (a) Failure envelope.
  - (b) Strain failure theory.
- 7 Discuss about Hygrothermal effects in a laminate.
- 8 Explain the failure criteria for a laminate.

\*\*\*\*\*