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Courses » Introduction To Composites

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Unit 11 - WEEK-10

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Course outline

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- Lecture 55:
Relation
Between
Engineering
Constants and
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Stiffness and
Compliance
Matrices- Part I

- Lecture 56:
Relation
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Assignment 10

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-04-10, 23:59 IST.**
assignment.

1) For an isotropic material which of the following statement related to stiffness matrix [C] is true? **1 point**

- $C_{66} = (C_{22} - C_{23})/2$
- $C_{11} = C_{23}$
- $C_{22} = C_{12}$
- All of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$C_{66} = (C_{22} - C_{23})/2$$

2)  **1 point**

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No, the answer is incorrect.

Score: 0

Accepted Answers:

3) Repeat problem 2 for $\theta = 30^\circ$. **1 point**

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Stress Strain Relations for A Lamina With Arbitrary Orientation- Part I

Lecture 58: Stress- Strain Relation for A Lamina With Arbitrary Orientation- Part II

Lecture 59: Strength of An Orthotropic Lamina

Lecture 60: Importance of Sign of Shear Stress in context of Strength of A Unidirectional Lamina

Quiz : Assignment 10

Introduction To Composites : Feedback For Week 10

Assignment 10 Solution

WEEK-11

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Interaction Session

b) The number of independent elastic constants for generally orthotropic and specially orthotropic materials are different.

c) For an isotropic material, Young's modulus and shear modulus are always positive.

- Only c
- a and b
- a and c
- all a, b and c

No, the answer is incorrect.

Score: 0

Accepted Answers:

a and c

5) Longitudinal axis of an orthotropic lamina makes an angle of 45° with the x axis. Find maximum strength of lamina if it is subjected to a unidirectional tensile loading along x-axis. Use the maximum work theory and take the following strength values for the lamina: **1 point**

- 19.23 MPa
- 25.25 MPa
- 7.33 MPa
- 13.16 MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

19.23 MPa

6) Repeat problem 5 for $\theta = 60^\circ$. **1 point**

- 19.23 MPa
- 25.25 MPa
- 7.33 MPa
- 13.16 MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

13.16 MPa

7) A graphite-epoxy lamina shows the following strength properties: **1 point**

Using the maximum-work theory of failure, estimate off-axis shear strength of the lamina for orientations of 30° . (consider only positive shear stress)

- 276 MPa
- 44.9 MPa
- 163.2MPa
- 40 MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

163.2MPa

8) Which of the following statements are true?

1 point

a) Difference between generally and specially orthotropic material is a function of a reference coordinate system only.

b) The stiffness matrix for a generally orthotropic material contains 36 non zero elements and all 36 elements are obtained only from the 9 independent elements.

c) A transversely isotropic material has only four independent elastic constants.

- b and c
- a and c
- a and b
- all a, b and c

No, the answer is incorrect.

Score: 0

Accepted Answers:

a and b

9) Select the correct statement for transformation matrices

1 point

where $[T_1]$ - stress transformation matrix

$[T_2]$ - strain transformation matrix

- $[T_1(\theta)]^{-1} = [T_1(-\theta)]$ and $[T_2(\theta)]^{-1} = [T_2(-\theta)]$
- $[T_1(\theta)]^{-1} = [T_1(-\theta)]^T$ and $[T_2(\theta)]^{-1} = [T_2(-\theta)]^T$
- $[T_1(\theta)]^{-1} = -[T_1(\theta)]$ and $[T_2(\theta)]^{-1} = -[T_2(\theta)]$
- A and C

No, the answer is incorrect.

Score: 0

Accepted Answers:

$[T_1(\theta)]^{-1} = [T_1(-\theta)]$ and $[T_2(\theta)]^{-1} = [T_2(-\theta)]$

10) Which of the following materials has 21 independent elastic constants?

1 point

- monoclinic material.
- orthotropic material.
- anisotropic material.
- transversely isotropic material.

No, the answer is incorrect.

Score: 0

Accepted Answers:

anisotropic material.

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