Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2018-09-05, 23:59 IST.

1) A laminate is called quasi-isotropic when its ............... is similar to that of an isotropic material.
- bending stiffness matrix
- extensional stiffness matrix
- coupling stiffness matrix
- extensional and coupling stiffness matrix

No, the answer is incorrect.
Score: 0
Accepted Answers: extensional stiffness matrix

2) Which of the following conditions exist for an orthotropic laminate with respect to in plane stresses and strains?
- D16 = D26 = 0
- A16 = A26 = D16 = D26 = 0
- A16 = A26 = 0
- A16 = A26 = 0 and [B]=0

No, the answer is incorrect.
Score: 0
Accepted Answers: A16 = A26 = 0

3) Which of the following statements are true?
1. It is possible to design a laminate that will be symmetric as well as specially orthotropic with
- only $D_{16}$ and $D_{26}$ cannot be made equal to zero for asymmetric laminate
- Only 1
- Only 2
- Both 1 and 2

Score: 0
Accepted Answers: Both 1 and 2
4) The coupling between the extension and bending of the laminate introduced by the matrix $[B]$ is attributable to the …

- anisotropy of the layers.
- orthotropy of the layers.
- heterogeneity of the laminate.
- all of these.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- heterogeneity of the laminate.

5) Which of the following laminates behave as a specially orthotropic materials?  

- Angle-ply laminates.
- Cross-ply laminates.
- Anti-symmetric laminates.
- All of these.

No, the answer is incorrect.
Score: 0
Accepted Answers:
- All of these.

6) Longitudinal axis of an orthotropic lamina makes an angle of $45^\circ$ with the $x$ axis. What is the maximum strength of lamina if it is subjected to unidirectional tensile loading along $x$ axis? (Use Tsai-Hill failure theory)

$$\sigma_x = \frac{4\sigma_{TU}^tLTU}{\sqrt{\sigma_{TU}^2 + \tau_{LTU}^2}}$$

No, the answer is incorrect.
Score: 0
Accepted Answers:
7) A graphite-epoxy lamina shows the following strength properties:

\[ \sigma_{LU} = 500 \text{ MPa} \quad \sigma_{TU} = 5 \text{ MPa} \]

\[ \sigma'_{LU} = 350 \text{ MPa} \quad \sigma'_{TU} = 75 \text{ MPa} \quad \tau_{LU} = 35 \text{ MPa} \]

Using Tsai-Hill failure theory, estimate off-axis shear strength (both positive and negative shear strength) of the lamina for orientations of 60°.

- 54.54 MPa and 9.75 MPa, respectively
- 54.54 MPa and 5.75 MPa, respectively
- 45.45 MPa and 5.75 MPa, respectively
- 45.45 MPa and 9.75 MPa, respectively

No, the answer is incorrect.

Score: 0

Accepted Answers:
54.54 MPa and 5.75 MPa, respectively

8) Calculate the ratio of transverse modulus \((E_T)\) of the composite to the matrix modulus using the Halpin-Tsai equation for glass-epoxy composites with 50% fibers by volume. Elastic moduli of glass fibers, and epoxy resin are 70, and 3.5 GPa, respectively.

- 3.28
- 3.83
- 1.28
- 1.32

No, the answer is incorrect.

Score: 0

Accepted Answers:
3.28

9) Which of the following statements are true for a symmetric laminate?

1. For symmetric laminates B matrix is zero.
2. Any applied extensional stresses will produce only in-plane and shear strains and will not produce any curvatures.
3. Strains in each ply will be same as mid plane strains.

- Only 1
- 1 and 2
- 1 and 3
- all

No, the answer is incorrect.

Score: 0

Accepted Answers:
all

10) According to one of the assumptions of the Classical Lamination Theory, there is no slip between adjacent layers of the laminate. This statement is equivalent to stating that______________.

- Stress components are continuous through the thickness of the laminate
- Stresses are continuous through the thickness of the laminate
- Strains are continuous through the thickness of the laminate

No, the answer is incorrect.

Score: 0

Accepted Answers:
Stresses are continuous through the thickness of the laminate
Displacement components are continuous through the thickness of the laminate

Stress and displacement both are continuous through the thickness of the laminate

None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
Displacement components are continuous through the thickness of the laminate