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Courses » Introduction To Composites

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## Unit 8 - WEEK 07

Register for  
Certification exam

### Course outline

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WEEK 07

- Lecture 37:  
Transverse  
modulus of  
unidirectional  
composites
- Lecture 38:  
Transverse  
strength of  
unidirectional  
composites
- Lecture 39:  
Poisson's ratio  
of unidirectional  
composites
- Lecture 40:  
Failure modes  
of composite

## Assignment 07

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-03-20, 23:59 IST.**  
assignment.

1) The transverse modulus of a unidirectional composite material is most strongly influenced **1 point**  
by :

- Matrix properties.
- Fiber properties.
- Interfacing between matrix and fiber.
- None of these

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Matrix properties.*

2) Which of the following is true for a unidirectional composite loaded in tension. **1 point**

- Transverse strength of the composite material is more than the transverse strength of matrix of the composite.
- Transverse strength of the composite material is less than the transverse strength of matrix of the composite.
- Transverse strength is same for both of these materials.
- None of these is true.

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

*Transverse strength of the composite material is less than the transverse strength of matrix of the composite.*

3) Estimate the transverse modulus ( $E_T$ ), of the glass-epoxy composite with a **1 point**  
fiber volume fraction of 25%. Modulus of elasticity of glass fiber and epoxy is 70  
GPa, and 3.5 GPa, respectively. Assume that fibers have a circular cross-section.

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- Quiz : Assignment 07
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WEEK 08

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 10.5 GPa**No, the answer is incorrect.****Score: 0****Accepted Answers:***6.5 GPa*

4) Which one of the following does not occur during a composite failure in longitudinal compression mode? **1 point**

- Transverse tensile failure of the matrix.
- Fiber breakage
- Buckling of fibers
- Shear failure

**No, the answer is incorrect.****Score: 0****Accepted Answers:***Fiber breakage*

5) Estimate the shear modulus ( $G_{LT}$ ), of the graphite-epoxy composite with a **1 point** fiber volume fraction of 50%. The shear modulus of graphite fiber and epoxy is 10.4 GPa, and 1.5 GPa respectively. Assume that fibers have a circular cross-section.

- 3.3 GPa
- 3.0 GPa
- 2.7 GPa
- 5.3 GPa

**No, the answer is incorrect.****Score: 0****Accepted Answers:***3.3 GPa*

6) For unidirectional composites, the moisture expansion coefficient is virtually negligible for which direction? **1 point**

- Longitudinal direction
- Transverse direction
- Both longitudinal as well as transverse directions
- None of these

**No, the answer is incorrect.****Score: 0****Accepted Answers:***Longitudinal direction*

7) Estimate the coefficient of thermal expansion for a unidirectional glass-**1 point** polyester composite in the longitudinal direction. The fiber volume fraction of the composite is 40%. Assume the following constituent properties.

Coefficient of thermal expansion for fiber ( $\alpha_f$ ) =  $0.5 \times 10^{-5} / ^\circ\text{C}$

Coefficient of thermal expansion for matrix ( $\alpha_m$ ) =  $9.0 \times 10^{-5} / ^\circ\text{C}$

Young's modulus of fiber ( $E_f$ ) = 70 GPa ; Young's modulus of matrix ( $E_m$ ) = 3.5 GPa

Poisson's ration of fiber ( $\nu_f$ ) = 0.2 ; Poisson's ration of matrix ( $\nu_m$ ) = 0.35

- 1.92\*10-5
- 1.09\*10-5
- 0.77\*10-5
- 0.61\*10-5

No, the answer is incorrect.

Score: 0

Accepted Answers:

1.09\*10-5

8) Calculate the major Poisson's ratio for Kevlar-epoxy composite with a fiber volume fraction of 30%. The Poisson's ratios for Kevlar and epoxy are 0.20 and 0.35, respectively. **1 point**

- 0.20
- 0.25
- 0.30
- 0.35

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.30

9) Which of the following is the most common type of failure when a unidirectional composite fails due to transverse tensile load? **1 point**

- Matrix failure
- Fiber debonding
- Fiber splitting
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

Matrix failure

10) In general "fiber breakage" type of failure mode occurs in glass fiber composite, when: **1 point**

- $V_f < 40\%$
- $65\% > V_f > 40$
- $V_f > 65\%$
- None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

$V_f < 40\%$

