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Unit 7 - WEEK 06

Register for Certification exam

Course outline

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Lecture 31: Failure of Unidirectional Lamina

Lecture 32: Minimum Volume Fraction and Critical Volume Fraction

Lecture 33: Example based on Failure of Composite Material

Lecture 34: Example based on Minimum and Critical

Assignment 06

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

1) A burn-off test was performed to determine the volume fractions of constituents in a glass-fiber-reinforced epoxy composite. The following observations were made: ***1 point***
Weight of empty crucible = 47.6504 g
Weight of crucible and a small piece of composite = 50.1817 g
Weight of crucible and glass after the burn-off = 49.4476 g
Assume that the densities of the fibers and resin are 2.5 and 1.2 g/cm3, respectively. The weight and volume fractions of epoxy resin are....., respectively.

- 0.71 and 0.29
- 0.29 and 0.46
- 0.54 and 0.46
- 0.71 and 0.54

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.29 and 0.46

2) Fiber volume fraction in a unidirectional composite in which cylindrical fibers are packed in hexagonal arrays (as shown in figure) is..... (d- diameter of fiber; s - side of hexagonal) ***1 point***

-
-
-
-

No, the answer is incorrect.
Score: 0

Accepted Answers:

3) Vmin and Vcrit arises in a composite due to..... (Where Vmin – minimum fiber volume ***1 point***

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No, the answer is incorrect.
Score: 0

Accepted Answers:
Strain hardening and plastic flow of the matrix.

4) Ratio of the load shared by fiber and matrix in unidirectional continuous fiber composite subjected to longitudinal tensile loading is a function of..... ***1 point***

- Ratio of elastic moduli of the fiber and matrix
- Ratio of volume fraction of fiber and matrix
- Ratio of density of fiber and matrix
- A and B both

No, the answer is incorrect.
Score: 0

Accepted Answers:
A and B both

5) Which of the following statements are true? ***1 point***

1. Fracture toughness can be improved by decreasing adhesion.
2. Improved adhesion enhances water resistance of polymer matrix composites.

- Only 1
- Only 2
- Both 1 and 2
- None of these

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both 1 and 2

6) The material of a tension link is changed from an aluminium alloy to a unidirectional graphite-epoxy composite. If the longitudinal modulus of composite is same as that of the aluminium alloy, then the percentage weight saving in this material replacement is..... ***1 point***

- 17.2%
- 51.1%
- 28.1%
- 48.3%

No, the answer is incorrect.
Score: 0

Accepted Answers:
51.1%

7) Which of the following statement is true? ***1 point***

- The response of the composite to compressive load strongly depends on the matrix properties while to longitudinal tensile load strongly depends on the fiber properties.
- The response of the composite to compressive load strongly depends on the fiber properties while to longitudinal tensile load strongly depends on the matrix properties.
- The response of the composite to compressive and longitudinal load strongly depends on fiber properties only.
- The response of the composite to compressive and longitudinal load strongly depends on matrix properties only.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The response of the composite to compressive load strongly depends on the matrix properties while to longitudinal tensile load strongly depends on the fiber properties.

8) A unidirectional glass-epoxy composite has Vm/Vf= 1.5. What minimum volume fraction of carbon fibers should be added to the glass-epoxy composite, without changing the ratio of volume fractions of epoxy resin and glass fibers, to obtain any strengthening? Following are the constituent properties. (Hint: In glass/carbon/epoxy system glass/epoxy system acts like the matrix material) ***1 point***

- 63.7%
- 37.6%
- 30.9%
- 40.25%

No, the answer is incorrect.
Score: 0

Accepted Answers:
37.6%

9) Consider a unidirectional composite loaded in the fiber direction. (Assume that there are no voids in composite and Vf = 25%, Ef = 400 GPa and Em = 3.2 GPa.) The ratio of fiber stress to composite stress is..... ***1 point***

- 5.67
- 3.91
- 4.91
- 1.83

No, the answer is incorrect.
Score: 0

Accepted Answers:
3.91

10) Properties of the.....composite material can be isotropic. ***1 point***

- Unidirectional continuous fiber
- Bidirectional continuous fiber
- Uniformly oriented discontinuous fiber
- Randomly oriented discontinuous fiber

No, the answer is incorrect.
Score: 0

Accepted Answers:
Randomly oriented discontinuous fiber

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