**Multiple Choice Quiz: Section 3.4: Ultimate Strengths of a Unidirectional Lamina**

_____ 1. It is possible that by adding fibers to the matrix, the composite will have lower ultimate longitudinal tensile strength than the matrix alone. What is the fiber volume fraction for which this is possible called?

A minimum fiber volume fraction.

B maximum fiber volume fraction.

C critical fiber volume fraction.

_____ 2. How many plies are generally used when experimentally finding the longitudinal tensile strength of a unidirectional lamina?

A 30-40

B 1-2

C 16-20

D 6-8

_____ 3. Once the fibers have broken in a unidirectional lamina under a longitudinal tensile stress , sometimes a composite can take more load. What is the volume fraction of fibers called for which this is possible?

A critical fiber volume fraction.

B minimum fiber volume fraction.

C maximum fiber volume fraction.

_____ 4. How many plies are generally used to experimentally find the longitudinal compressive strength of a unidirectional lamina?

A 16-20

B 30-40

C 1-2

D 6-8

_____ 5. True or False: In a ceramic matrix composites when loaded along the fibers by a uniaxial load, generally matrix breaks precede fiber breaks.

A False

B True

_____ 6. Generally, for polymer matrix composites, the maximum strain to failure is greater for

A the matrix.

B they are equal.

C the fiber.

_____ 7. Unidirectional composites are tested because

A The results can be directly used to predict behavior in an off-axis lamina.

B They are used in most applications.

C They are easy to manufacture.

_____ 8. Poor bonding between the fiber and matrix results in

A no change in the composite tensile transverse strength.

B an increase in the composite tensile transverse strength.

C a decrease in the composite tensile transverse strength.

_____ 9. The component in a polymeric matrix composite which carries the largest percentage of the applied uniaxial load along the fibers is

A the fibers.

B the matrix.

C Neither, the fiber and matrix share the load equally.

_____ 10. Adding more fibers to a matrix in a poylmer matrix composite

A increases the ultimate longitudinal tensile strength of the composite compared to the matrix.

B has no effect.

C decreases the ultimate longitudinal tensile strength of the composite compared to the matrix.

_____ 11. If the stress intensity factor is greater than the critical stress intensity factor for a material, then

A the material is safe.

B the strain energy is less.

C the fracture will grow catastrophically.

_____ 12. When a crack develops in an isotropic material, the stresses at the crack tip are

A equal to one.

B infinite.

C equal to zero.

D cannot be found.

_____ 13. The theoretical longitudinal compressive strength does not estimate the experimentally found values well because of several factors. Check all that apply.

A Accounting for Poisson's ratio mismatch between the fiber and the matrix

B Perfect bonding of fibers

C Poor alignment of fibers

D Irregular spacing of fibers