Multiple Choice Quiz: Section 1.1: Introduction

_____ 1. A composite is structural material? What is it defined as? (Choose most appropriate answer)

A consisting of two or more constituents

B metal

C polymers

D ceramics

_____ 2. Advanced composites are

A naturally found.

B traditionally used in aerospace industries.

C low performance composites.

_____ 3. Composites are easy to repair.

A False

B True

_____ 4. What fiber factors contribute to the mechanical performance of a composite?

A Orientation.

B Length, Shape and Orientation.

C Shape.

D Length.

_____ 5. The most common advanced composites are

A Ceramic Matrix Composites.

B Polymer Matrix Composites.

C Metal Matrix Composites.

_____ 6. One of the major drawbacks of composites is

A they are heavier than metals for the same applications

B high cost of fabrication

C low Young's modulus

_____ 7. What is the percentage annual growth of composites?

A 10 percent.

B -15 percent.

C 15 percent.

D 5 percent.

_____ 8. Reducing one pound of mass in a commercial aircraft can save up to how many gallons per year?

A 350.

B 3500.

C 50.

D 30000.

_____ 9. A steel wire will generally have _____ order of strength than the bulk steel it is made from.

A Much higher

B Same

C Much lower

_____ 10. A steel wire will generally have _____ order of Young's modulus than the bulk steel it is made from.

A Much lower

B Much higher

C Same

_____ 11. What is the most common cross-sectional shape of fibers?

A Square

B Triangular

C Circular

D Rectangular

_____ 12. Where are advanced composites primarily used?

A marine industry

B furniture industry

C construction industry

D aerospace industry

_____ 13. What is the definition of specific modulus?

A Young's modulus/density

B Young's modulus/specific gravity

C density/Young's modulus

D Young's modulus/specific heat

_____ 14. Fibers are of thin diameter because they have _____ than the bulk material

A higher flexibility

B lower toughness

C lower strength

D lower stiffness

_____ 15. The lightest mass of the beam required to take a compressive load and avoid buckling depends on the ratio E^a/ρ (E=Young's modulus, ρ=density). What is the value of *a*?

A 1/2

B 2

C 1/3

D 1

_____ 16. The lightest mass of the beam required to take a tensile load depends on the ratio E^a/ρ (E=Young's modulus, ρ=density). What is the value of *a*?

A 1

B 1/3

C 1/2

D 2

_____ 17. The lightest mass required to have minimum deflection in a beam with a bending load depends on the ratio E^a/ρ (E=Young's modulus, ρ=density). What is the value of *a*?

A 2

B 1/2

C 1/3

D 1

_____ 18. What is the largest ingredient in glass fibers?

A aluminum oxide

B silicon oxide

C calcium oxide

D boron oxide

_____ 19. Other than Young's modulus, what does the flexibility of a circular rod depend on?

A diameter

B shear modulus

C length

D Poisson's ratio

_____ 20. Specific modulus is given by

A density/strength.

B density/Young's modulus.

C Young's modulus / density.

D strength / density.

_____ 21. To measure normal strain experimentally by a strain gage at a point in the body, I need to know _____ of the body

A nothing else

B shear strength

C Young's modulus

D Poisson's ratio

_____ 22. What is the unit of fracture toughness in the SI system?

A $\sqrt{}$MPa – m

B MPa- $\sqrt{}$m

C MPa- m

D $\sqrt{}$MPa - $\sqrt{}$m

_____ 23. Primary material selection parameters for metals are strength, affordability, corrosion resistance, and formability. What are the other two?

A joinability and surface smoothness

B joinability and toughness

C toughness and scratch resistance

D toughness and hardness

_____ 24. The area of the fiber-matrix interface for a fixed volume of fibers in a composite is inversely proportional to the d^p, where d is the diameter of the fiber. What is the value of p?

A 3

B 1

C 4

D 2

_____ 25. In biblical times, which material was used to reinforce the bricks?

A bamboo

B glass

C leaves

D straw

_____ 26. Which is NOT a significant fiber factor that contributes to the mechanical performance of a composite?

A mass

B orientation

C length

D material