

INTRODUCTION TO COMPOSITES -- MFG 555

Fall 1999 -- Exam 2

Professor: Brent Strong

Name: _____

All problems have the same value, although some problems may have several parts.

1. What are the special considerations that you must make in manufacturing very thick composite parts? (Example: the hull of a submarine that is 8 inches thick.) How do you solve these problems?

2. Identify in two or three sentences and with sufficient detail to uniquely characterize the following terms:

a) veil

b) b-stage

c) bleeder layer

d) static mixer

e) geodesic path

3. Give three reasons why vacuum bagging is almost always required for prepreg manufacturing but is rarely used for wet layup.

4. Advanced composites are generally those used for very high performance, such as aerospace and high end sporting goods. Engineering composites are generally those used for lower performance such as fiberglass reinforced plastics, automotive SMC and BMC, and injection moldable reinforced thermoplastics. Discuss the differences between the manufacturing methods for advanced composites (as a group) and for engineering composites (as a group) in light of the following questions:

- a) What are the minimum criteria that must be met by each type of material?
- b) What are the advantages and disadvantages of each type of general manufacturing method (advanced vs engineering)?
- c) What do you see as the direction of new manufacturing methods and why?

5. You have been asked to prepare a manufacturing plan for making carbon fiber/epoxy golf club shafts. A preliminary plan identified the following as possible manufacturing methods: filament winding, pultrusion, RTM and roll wrapping. Indicate two advantages and disadvantages in the use of each of the methods **for this application**. You have been told to expect production volumes of 10,000 shafts per year. Comment on the costs, quality, and performance expected from each of the methods.