INTRODUCTION TO COMPOSITES -- MFET555

Fall 2010 – Exam 2

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

1. Filament winding has the capability of using three types of feedstock: (a) tow which is impregnated as it is applied (wet winding), (b) tow which has been previously impregnated (prepreg tow), and (c) tape which has been previously impregnated (tape winding). Indicate two advantages and two disadvantages in using each of these materials.

(a)

(b)

(c)

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

a) short beam shear

b) scarf joint

c) symmetry and balance

d) VARTM

a) helical path

3. 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.

Filament winding

Pultrusion

RTM

Roll wrapping

4. As a manufacturing engineer for an automobile company, you have been asked to find a way to reduce the cost of an electrical junction box in the car. The box also serves as a support for some small motors so it must also be structural. The current part is made of aluminum but is coated with an epoxy paint for corrosion protection and to reduce the conductivity of the box in the case of an electrical short. Suggest a composite material for this application and justify your suggestion. Suggest and justify a manufacturing method.

Material

Manufacturing method