Mansoura University
Faculty of Engineering
Department of Textile Engineering
Selective course 1 (TX 6315)

First Semester
Date: January 16, 2013
Time: 3 hours
Full Mark: 90

Final Exam of Industrial Fabrics Technology for 3rd year

Please answer all the following questions:

1.1 List the major differences that distinguish technical textiles from conventional textiles. [*6 Marks*]

1.2 List six of the main categories of technical textiles. [*6 Marks*]

1.3 Build-tech is one of the main categories of technical textiles. Please list some of its applications and functional properties. [*6 Marks*]

1.4 Define the following terms: Ductility and Toughness. Explain with simple drawing. [*6 Marks*]

1.5 Define the term composite material and show how it would be classified. [*6 Marks*]

2. In your opinion how elastic properties of unidirectional composite would be differed if a woven fabric would be used as reinforcement replacing the fibers. (List your assumption first). [*10 Marks*]

3. For unidirectional long fibers reinforced composites, derive the equations that represent the composite modulus in both longitudinal direction and transverse direction (E_1 and E_2). [*10 Marks*]

4. Calculate the compliance matrix for unidirectional composite made from E-glass fibers (E_f=70 GPa, ν=0.25) and Epoxy matrix (E_m=5 GPa, ν=0.35) with total fiber volume fraction of 0.46. [*10 Marks*]

5.1 List the parameters affect the pressure drop across the fabric filter and discuss their impact on the filter performance. [*5 Marks*]

5.2 Calculate the area of a bag (A_b) given a bag diameter of 15 inches and a bag height of 20 feet. If the cloth area (A_c) is known to be 4,050 ft^2, how many bags would be used in a baghouse with the bag area (A_b) given above? [*5 Marks*]

6. Choose one of the applications that uses technical textile then show the steps needed to design such application in terms of types of material, material structure and construction. [*10 Marks*]

7. Discuss an idea of designing multi-layer protective clothing against harmful gas. (*Hint: State the problem outlines and challenges and then discuss proper solutions*) [*10 Marks*]

Best wishes,
Dr. Ebraheem Shady