TOBB EKONOMİ VE TEKNOLOJİ ÜNİVERSİTESİ

MAK 413 MECHANICS OF COMPOSITE MATERIALS

SPRING 2018

Due Date: 06.02.2018- Tuesday* (14:30)

HOMEWORK 2

1. Kaw 2nd ed. Prob. 2.16

2.16 The stresses in the global axes of a 30° ply are given as $\sigma_x = 4$ MPa, $\sigma_y = 2$ MPa, and $\tau_{xy} = -3$ MPa. Find the stresses in the local axes. Are the stresses in the local axes independent of elastic moduli? Why or why not?

2. Kaw 2nd ed. Prob. 2.18

2.18 Find the transformed reduced stiffness matrix $[\bar{Q}]$ and transformed compliance matrix $[\bar{S}]$ for a 60° angle lamina of a boron/epoxy lamina. Use the properties of a unidirectional boron/epoxy lamina from Table 2.1.

3. Kaw 2nd ed. Prob. 2.20

2.20 For a 60° angle lamina of boron/epoxy under stresses in global axes as $\sigma_x = 4$ MPa, $\sigma_y = 2$ MPa, and $\tau_{xy} = -3$ MPa, and using the properties of a unidirectional boron/epoxy lamina from Table 2.1, find the following

1. Global strains
2. Local stresses and strains
3. Principal normal stresses and principal normal strains
4. Maximum shear stress and maximum shear strain

4. Kaw 2nd ed. Prob. 2.21

2.21 An angle glass/epoxy lamina is subjected to a shear stress $\tau_{xy} = 0.4$ ksi in the global axes resulting in a shear strain $\gamma_{xy} = 468.3$ μin./in. in the global axes. What is the angle of the ply? Use the properties of unidirectional glass/epoxy lamina from Table 2.2.

5. Kaw 2nd ed. Prob. 2.22

2.22 Find the six engineering constants for a 60° boron/epoxy lamina. Use the properties of unidirectional boron/epoxy lamina from Table 2.2.

Due date is **Tuesday 6th of February, 2018**. For each delayed day **15 points** will be reduced.