題號： 221
科目：材料力學(A)
節次： 8

國立臺灣大學 105 學年度碩士班招生考試試題

題號： 221
共 / 頁之第 / 頁

Question 1 (25%)

The strains on the surface of an experimental device made of pure aluminum ($E = 70$ GPa, $v = 0.33$) and tested in a space shuttle were measured by means of strain gages. The gages were oriented as shown in the figure, and the measured strains were $\varepsilon_a = 1100 \times 10^{-6}$, $\varepsilon_b = 1496 \times 10^{-6}$, and $\varepsilon_c = -39.44 \times 10^{-6}$.
What is the maximum principal stress at this spot?
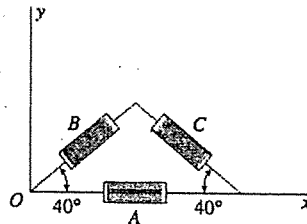
Question 2 (25%)

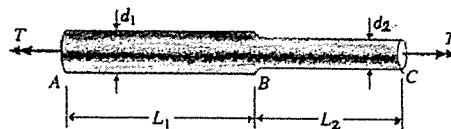Using the moment-area method, determine the slope of the beam at B.
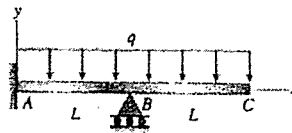
Question 3 (25%)

A brass plate with a modulus of elasticity $E = 110$ GPa and Poisson's ratio $v = 0.34$ is loaded in biaxial stress by normal stresses σ_x and σ_y. A strain gage is bonded to the plate at an angle $\phi = 35°$. If the stress σ_x is 74 MPa and the strain measured by the gage is $\varepsilon = 390 \times 10^{-6}$, what is the maximum in-plane shear stress?
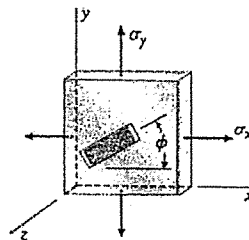
Question 4 (25%)

A solid, circular bar ABC consists of two segments. One segment has a diameter of $d_1 = 56$ mm and length of $L_1 = 1.45$ m. The other segment has a diameter of $d_2 = 48$ mm and length of $L_2 = 1.2$ m. What is the allowable torque T_{allow} if the shear stress is not to exceed 30 MPa and the angle of twist between the ends of the bar is not to exceed $1.25°$? (Assume $G = 80$ GPa)

試題隨卷繳回