

## 淡江大學九十一年度碩士班招生考試試題

系別：機械與機電工程學系

科目：材料力學

准帶項目請打「○」否則打「×」	
計算機	字典
○	×

本試題共 / 頁

1. (25%) Calculate the shearing stress in the 6 mm diameter pin at the pulley shown in Figure 1. Determine the average bearing stress between the pulley and the pin. The hub (輪轂) of the pulley is 12 mm thick.

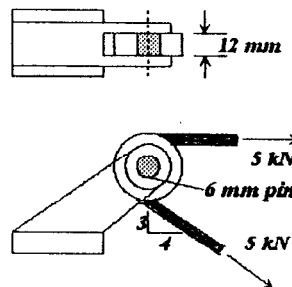


Figure 1

2. (25%) The compound shaft of Figure 2 is subjected to a torque of 5 kNm. Determine the angle of twist and the maximum shearing stress in materials 1 and 2, given the following values for the moduli of rigidity:  
 $G_1 = 2.5 \times 10^{10} \text{ N/m}^2$ ,  $G_2 = 7.8 \times 10^{10} \text{ N/m}^2$ .

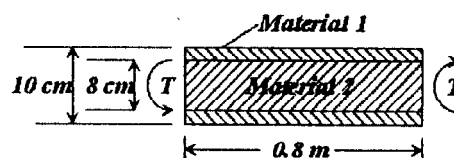


Figure 2

3. (25%) The aluminum shell of Figure 3 is fully bonded to the brass core and the assembly is unstressed at temperature of 15 °C. Considering only axial deformations, determine the stress in the aluminum when the temperature reaches 195 °C.  
 Brass Core:  $E = 105 \text{ Gpa}$ ,  $\alpha = 19 \times 10^{-6} / ^\circ\text{C}$   
 Aluminum Shell:  $E = 70 \text{ Gpa}$ ,  $\alpha = 23 \times 10^{-6} / ^\circ\text{C}$

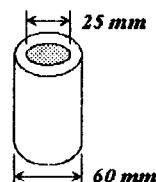


Figure 3

4. (25%) The simply supported prismatic beam AB carries a uniformly distributed load  $\omega$  per unit length (Figure 4). Determine the equation of the elastic curve and the maximum deflection of the beam.

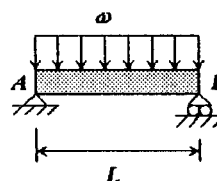


Figure 4