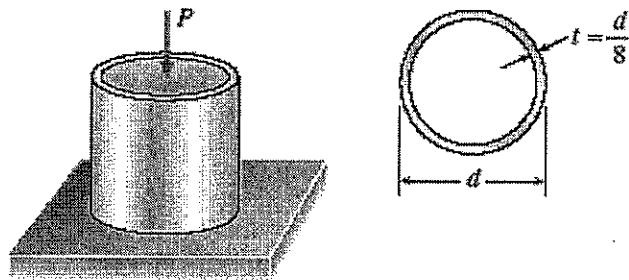明志科技大學 102 學年度研究所碩士班一般考試暨在職專班招生命題用紙

所別：機電工程研究所　　組別：　精密機械組　科目：　材料力學

注意：□不准□一般計算器■工程用計算器，考試時間總計：100 分鐘。試題共 2 頁第 1 頁

**Total Marks: 100**

1. **(25 Marks)**

   A pipe having yield stress $\sigma_y = 270$ MPa is to carry an axial compressive load $P = 1,200$ k N with a factor of safety of 1.8 against yielding.　What is the minimum required outer diameter if the thickness is on-eighth of its outer diameter?

   

2. **(25 Marks)**

   A circular tube is subjected to torsion by torques $T$ applied at the ends.　The bar is 20 in. long, and the inside and outside diameters are 1.2 in. and 1.6 in., respectively.

   When the torque is 5, 800 lb-in, it has a 3.63° angle of twist。

   Calculate

   (1) the maximum shear stress in the tube

   (2) the shear modulus of elasticity

   (3) the maximum shear strain (in radians)