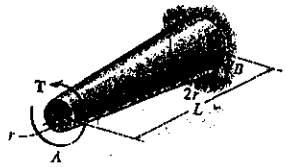
國立中央大學99學年度碩士班考試入學試題卷

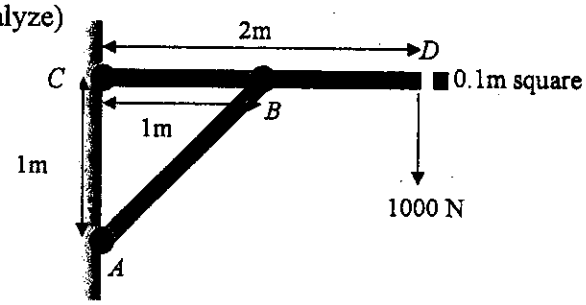
所別：機械工程學系碩士班 甲組(固力與設計)(一般生)　科目：材料力學　共 一 頁 第 一 頁

本科考試可使用計算器，廠牌、功能不拘　　＊請在試卷答案卷（卡）內作答

1. The tapered shaft is fixed at end *B* and is subjected to a torque **T**. It has a length *L* and a radius *r* at end *A* and 2*r* at end *B*. The shear modulus is *G*. Determine (a) the angle of twist of end *A*, and (b) the maximum shearing stress in the shaft. **(25%)**



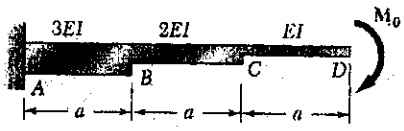
2. The girder *CD* of the structure is to support the cable loading by a weight 1000N, Please determine the maximum bending stress in the girder *CD* if *A*, *B* and *C* are pin-jointed. (Please use free body diagram to analyze) (25%)



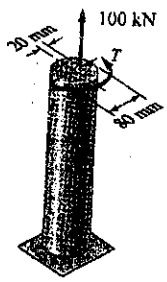
Young's modulus *E*

Area moment of inertia: $(bh^3)/12$

3. For the cantilever beam and loading shown, determine the deflection and slope at end *D* caused by the couple $\mathbf{M}_0$. **(25%)**



4. As shown in the following figure, the solid round bar with a diameter of 80 mm is fixed at one end. At the other end, the bar is subjected to a torque *T* and a tensile force 100 kN acting 20 mm from the centerline of the bar. If the allowable maximum normal stress in the bar is 80 MPa and the allowable maximum shear stress is 60 MPa, please determine the largest safe value of *T*. **(25%)**



參考用