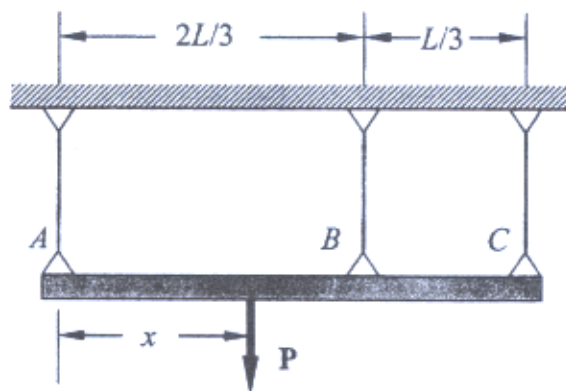


1. Considering a circular shaft of length L and of uniform cross section of radius c subjected to a torque T at both ends, list the basic assumptions about the deformations in the shaft and derive the relation between the angle of twist ϕ and the torque T as follows:

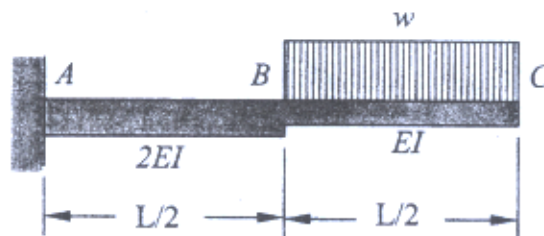
$$\phi = \frac{TL}{JG}$$

where G is the shear modulus of the material, J represent the polar moment of inertial of the cross section. (20%)

2. The rigid rod ABC is suspended by three identical wires. Determine the tension in each wire due to the force P and find the value of x for which all of the wires are subjected to equal load. (20%)

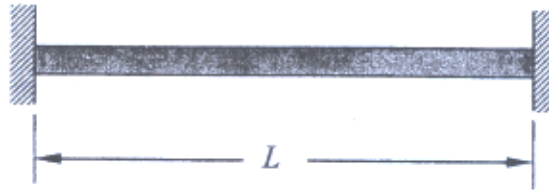


3. For the cantilever beam ABC , determine the deflection at (a) point B , (b) end C . (20%)



(背面仍有題目,請繼續作答)

4. The column has flexural rigidity EI , and coefficient of thermal expansion α . Assuming ideal conditions and elastic behavior, what increase ΔT in the temperature of the column will produce buckling? (20%)



5. Determine the maximum normal stress and maximum shear stress in the simple beam shown in the figure if $P = 500$ kg and the cross section has the dimension given in the sketch. (20%)

