系別：土木工程學系　　　　　　　科目：工 程 力 學（含靜力學、材料力學）

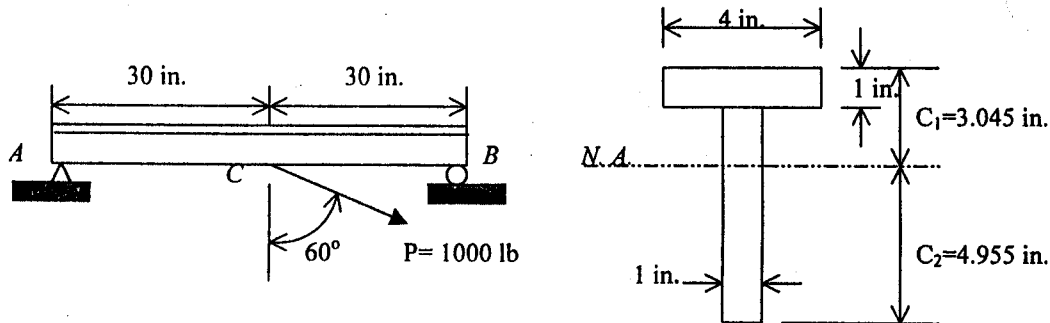| 准帶項目請打「○」否則打「×」	
計算機	字典
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1. Explain in short, (a) principle of energy method (b) principle of virtual work (c) plastic modulus of a cross-section (d) shear center of a cross-section. (20%)

2. A semicircular area of diameter 300 mm has a rectangular cutout of dimensions 50 mm × 100 mm. Calculate the moments of inertia I_x and I_y with respect to the x and y axes. (20%)
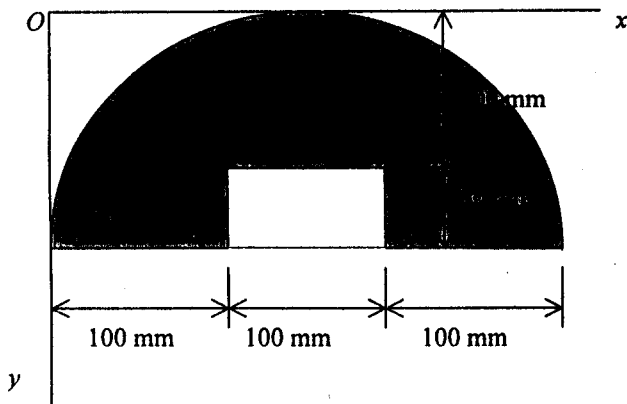
3. A T-section beam ACB of length L = 60 in. is simply supported at its ends and loaded by an inclined force P at mid-length. Load P is acting at the lower face of the beam ACB. The cross section of the T beam is given, where the neutral axis is 3.045 in. from the upper face of the beam as shown in the figure. Determine the maximum tensile and compressive stresses in the beam due to a load P = 1000 lb. (20%)

4. An element in plane stress is subjected to tensile stresses 12,300 psi, compressive stress 4,200 psi and shear stress 4,700 psi, as shown in the figure, (a) Determine the principal stresses and show them on a sketch of a properly oriented stress element. (b) Determine the maximum shear stresses and show them on a sketch of a properly oriented stress element. (Consider only the in-plane shear stress) (20%)

y

4,200 psi

12,300 psi

x

4,700 psi
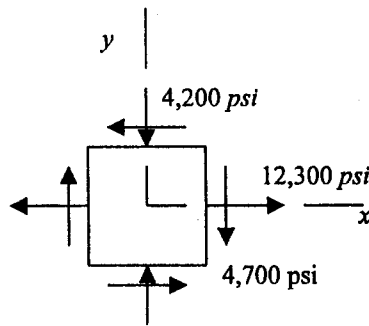
5. A slender column AB with one fixed end and the other end roller-connected as shown in the figure. Derive (in detail) the critical buckling load P_{cr} and the equation of the deflection curve for the buckled column. (Hint: tan 4.4934 = 4.4934) (20%)

x

P

B

EI, L

y　　A