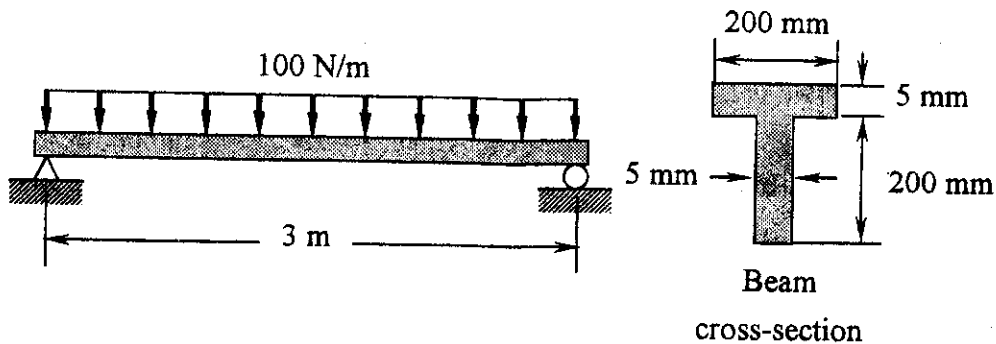
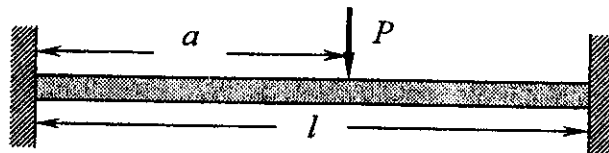


本試題是否可以使用計算機:  可使用,  不可使用 (請命題老師勾選)

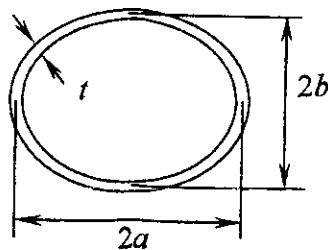
1. For the uniform beam shown in the figure, determine the maximum bending stress and the maximum shearing stress. ( $E = 200\text{Gpa.}$ ) (20%)



2. For the beam shown in the figure, determine the support reactions and the equation of the elastic curve. Draw the shearing force and the bending moment diagrams for the beam. (20%)



3. A thin tube having an elliptical cross section as shown is subjected to a torque  $T$ . Determine the shear stress  $\tau$  and the angle of twist per unit length  $\theta$ . (Note: The area of an ellipse is  $\pi ab$  and its circumference is approximately  $1.5\pi(a+b) - \pi\sqrt{ab}$ .) (20%)



(背面仍有題目, 請繼續作答)

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編號： 129 系所：土木工程學系丙組 丁組

科目：材料力學

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）

4. An element in plane strain is subjected to strains  $\epsilon_x = 500 \times 10^{-6}$ ,  $\epsilon_y = 300 \times 10^{-6}$ , and  $\gamma_{xy} = 150 \times 10^{-6}$ . Determine (a) the principal strains and principal planes and (b) the maximum shear strains and the planes on which they act. Show each result on a sketch of the element. (20%)
5. A slender bar with hinged ends is held at the ends by immovable supports (See figure). Assuming ideal conditions and elastic behavior, what increase  $\Delta T$  in the temperature of the bar will produce buckling? (Assume  $\alpha$  = coefficient of thermal expansion.) (20%)

