

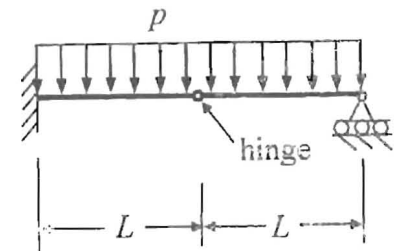
系所組別： 航空太空工程學系乙組

考試科目： 材料力學

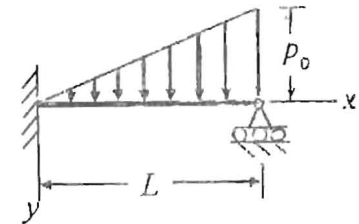
考試日期： 0219，節次： 1

※ 考生請注意：本試題 可 不可 使用計算機

1. (25%) A beam with a rectangular cross section of width b and height h is subjected to a uniformly distributed load as shown. Find (a) all the supported reactions; (b) the maximum bending stress; and (c) the maximum shear stress. Express your answers in terms of p , L , b , and h .



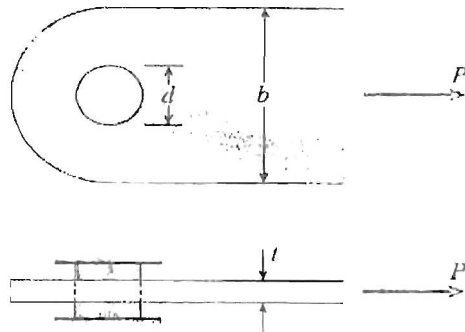
2. (25%) The flexural rigidity EI of the beam shown is constant; E is Young's modulus of material, and I is the second moment of inertia. Find the equation of the deflection curve for the beam.



(背面仍有題目,請繼續作答)

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3. (25%) A bar of rectangular cross section is subjected to an axial load P (see figures below). The bar has width $b = 60$ mm and thickness $t = 10$ mm. A hole of diameter d is drilled through the bar to provide for a pin support. The allowable *tensile* stress in the bar is 140 MPa, and the allowable *shear* stress in the pin is 80 MPa. The allowable *bearing* stress between the pin and the bar is 200 MPa.
- (a) Given the pin diameter $d = 10$ mm, determine the allowable load P_{allow} .
- (b) Determine the pin diameter d_m for which the load P will be a *maximum*.



4. (25%) The system shown below consists of two bars AB and BC, each of flexural rigidity EI and length L , elastically hinged together at B by a *torsional* spring of stiffness K .
- (a) Derive an equation for the buckling load P_{cr} of the system.
- (b) Find the lowest buckling loads when (i) $K \rightarrow \infty$ and (ii) $EI \rightarrow \infty$, respectively.
- (c) Justify the results you obtained in (b).

