題號： 273
科目： 材料力學(E)
節次： 8

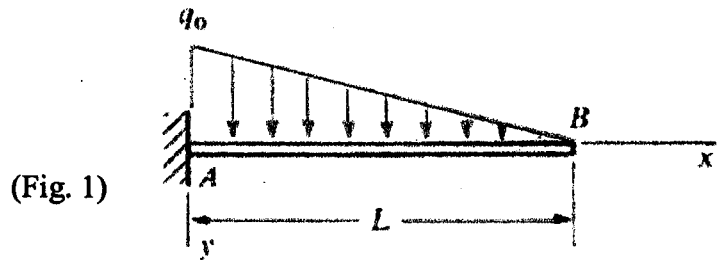國立臺灣大學 108 學年度碩士班招生考試試題

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Problem 1 (25%)

(a) Determine the equation of the deflection curve for a cantilever beam AB supporting a triangularly distributed load of maximum intensity q_0. (12%)

(b) Determine the deflection δ_b at the free end B. (7%)

(c) Determine the angle of rotation θ_b at the free end B. (6%)

(Fig. 1)

Problem 2 (25%)

The cantilever beam AB shown in the figure has moments of inertia I_2 and I_1 in parts AC and CB, respectively.

(a) Determine the deflection δ_b at the free end B due to the load P. (15%)

(b) If the cantilever beam AB is uniform, i.e. $I_1 = I_2$, what is the deflection δ_{b1} at the free end B? (10%)

(Fig. 2)
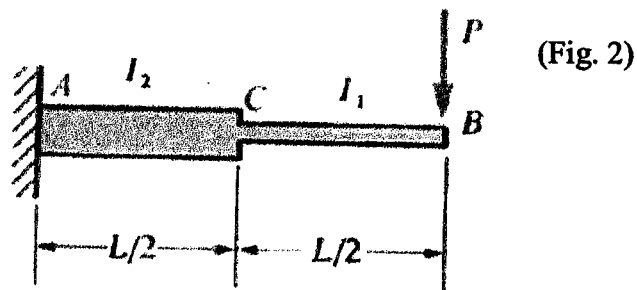
Problem 3 (25 %)

Determine the principal stresses and the maximum shearing stress at points on the top and bottom of section a-a of the pipe system shown in Fig. 3. The pipe has an outside diameter of 1 in. and a wall thickness of 1/8 in.

Fig. 3
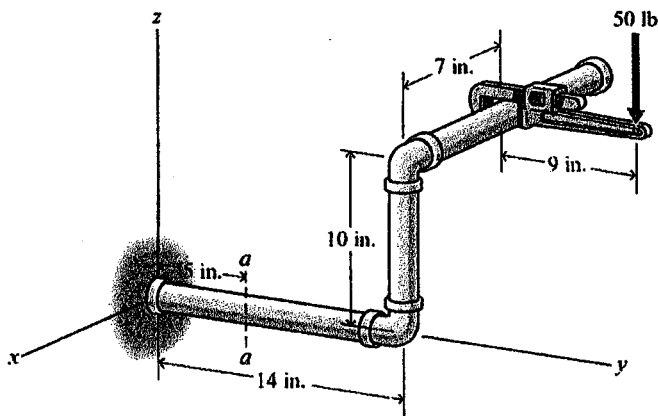
Problem 4 (25 %)

The timber beam shown in Fig. 4(a) has the cross section shown in Fig. 4(b). If the allowable stresses are 200 psi shear and 400 psi compression at point A, which is 2 ft from the left end of the beam and 2 in below the top surface of the beam, determine the maximum allowable load P.

Fig. 4

(a)   (b)

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