

每題 25 分, 共計 100 分。

Prob. 1. A single pin  $B$  is used to connect the steel bar  $DE$  to two brass strips, each of 20-mm width and 4-mm thickness. Knowing that the modulus of elasticity is 200 GPa for steel and 105 GPa for brass, determine the deflection (a) of point  $E$ , (b) of pin  $B$ .

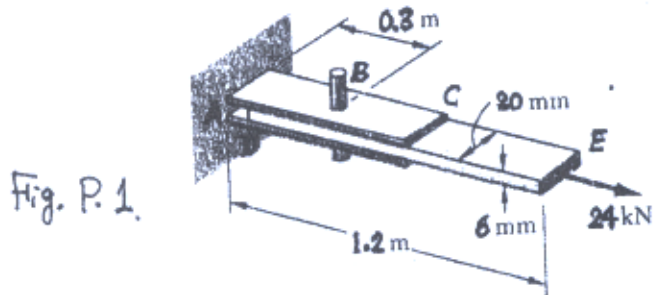


Fig. P. 1.

Prob. 2. The composite shaft shown is twisted by applying a torque  $T$  at end  $A$ . Knowing that the maximum shearing stress in the aluminum shell is 60 MPa, determine the corresponding maximum shearing stress in the steel core. Use  $G = 80$  GPa for steel and  $G = 27$  GPa for aluminum.

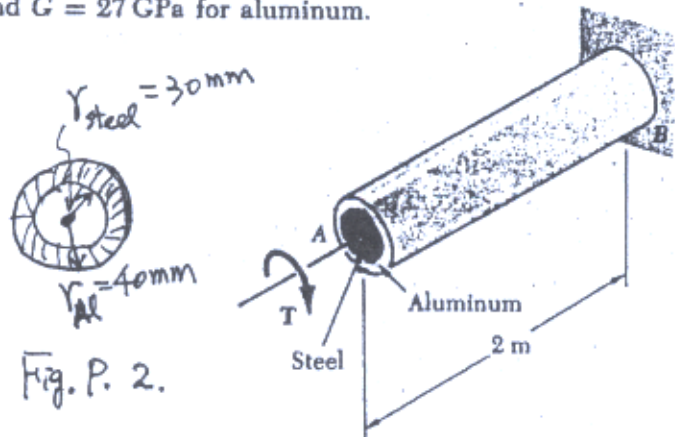


Fig. P. 2.

Prob. 3. A single strain gage forming an angle of  $15^\circ$  with a horizontal plane must be used to determine the gage pressure in the cylindrical steel tank shown. The cylindrical body of the tank is 6 mm thick and has a 600-mm inside diameter. It is made of a steel for which  $E = 200$  GPa and  $\nu = 0.29$ . For a strain gage reading of  $350 \mu$ , determine the pressure in the tank.

(Hint:  $\epsilon(\theta) = \epsilon_x \cos^2 \theta + \epsilon_y \sin^2 \theta + \gamma_{xy} \sin \theta \cos \theta$ )

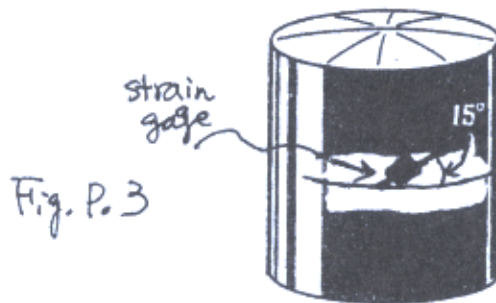


Fig. P. 3

(背面仍有題目, 請繼續作答)

Prob. 4 Knowing that the allowable stress in section *aa* of the hydraulic press shown is 6 ksi in tension and 12 ksi in compression, determine the largest force  $P$  which may be exerted by the press.

(Hint: Determine the centroid of section *a-a*, first, then compute the moment of area about the centroid.)

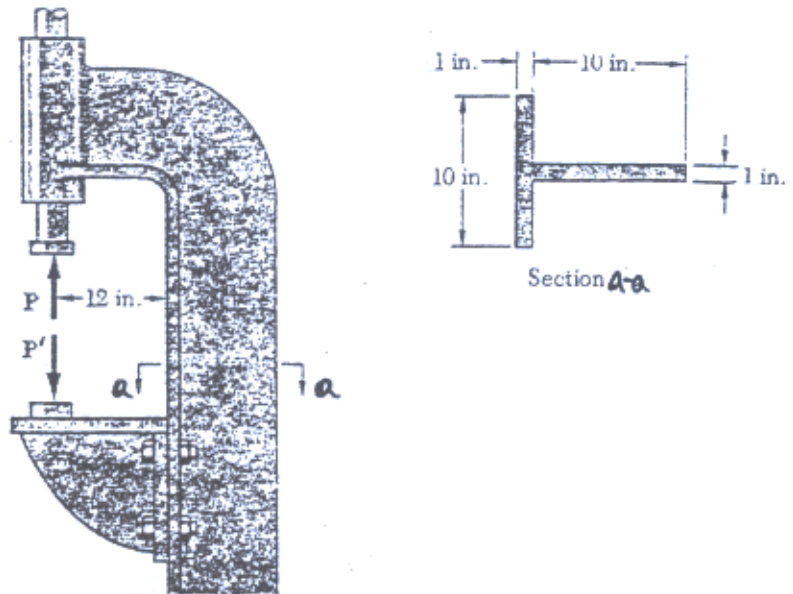


Fig. P. 4