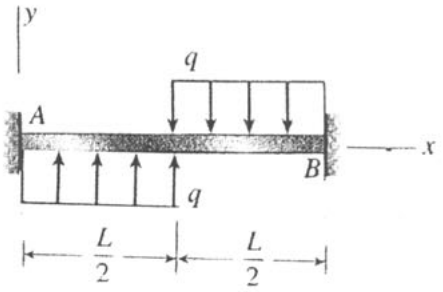
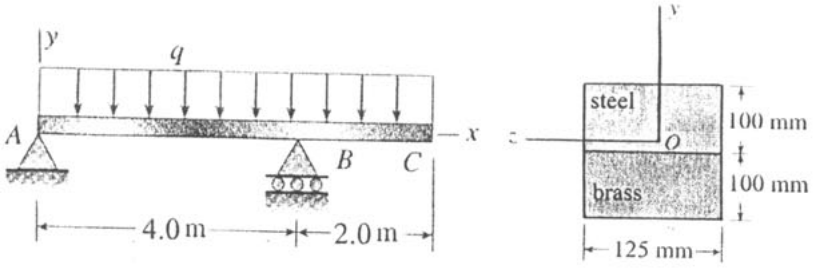
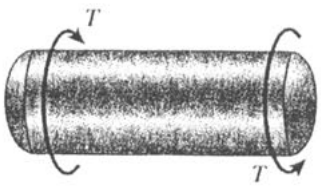
1. A fixed-end beam AB of length L supports a distributed load of constant intensity q, as shown in the figure. The beam has constant flexural rigidity EI. Determine the maximum deflection of the beam. (20%)



2. The bimetallic beam ABC carries a uniform load of intensity q acting throughout the entire length of the beam. The beam is made of steel bonded to brass and has the cross section shown. The moduli of elasticity for steel and brass are $E_{st} = 200$ GPa and $E_{br} = 100$ GPa, respectively. Determine the maximum permissible value of q if the allowable bending stress in the steel is 180 MPa and in the brass is 60 MPa. (Disregard the weight of the beam.) (20%)

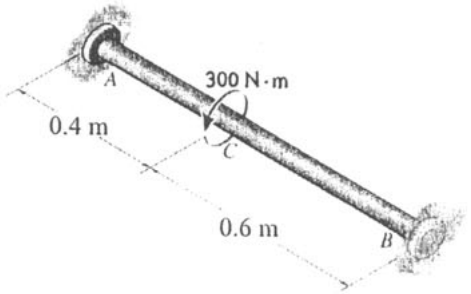


3. A thin-walled circular cylindrical tank is subjected to internal pressure p = 10 MPa and a torque $T = 1.2$ kN·m. The cylinder has radius r = 50 mm and wall thickness t = 4 mm. Determine the maximum tensile, compressive and shear stresses in the wall of the cylinder. (20%)



(背面仍有題目,請繼續作答)

4. The steel tube *ACB* has an inner diameter of 35 mm and an outer diameter of 60 mm, and it is fixed at ends *A* and *B*. The shear modulus for steel is $G = 75$ Gpa. (a) Determine the angle of twist at *C*. (b) Plot the shear-stress distribution along a radial line of the cross section in region *AC*. (20%)



5. The equal-leg angle section of a beam is subjected to a shear force *V* (see figure). Determine the maximum shear stress in the cross section if $V = 20$ kN, $b = 100$ mm and $t = 6$ mm. (20%)