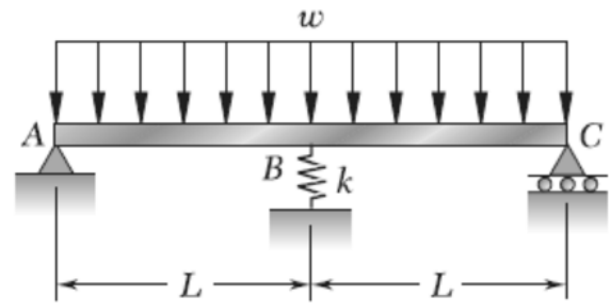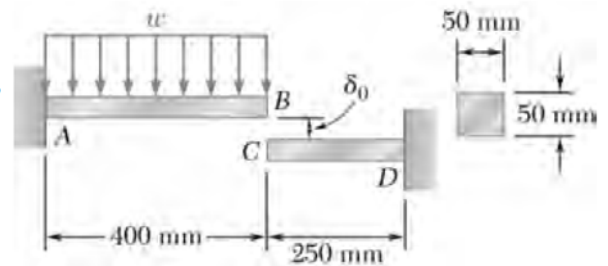1. For the beam and loading shown, determine the spring constant k for which the bending moment at B is $M_B = -wL^2/10$.

2.

Before the uniformly distributed load w is applied, a gap, $\delta_0 = 1.2$ mm, exists between the ends of the cantilever bars AB and CD. Knowing that $E = 105$ GPa and $w = 30$ kN/m, determine (a) the reaction at A, (b) the reaction at D.

3. The beam shown in the figure has a guided support at A and a spring support at B. The guided support permits vertical
movement but no rotation. Derive the equation of the deflection curve and determine the deflection at end B due to the uniform load of intensity q.

$$k = 48EI/L^3$$