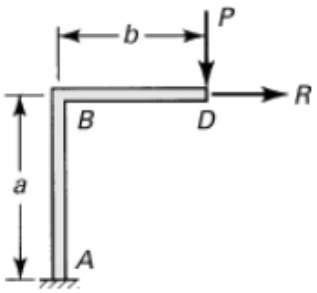
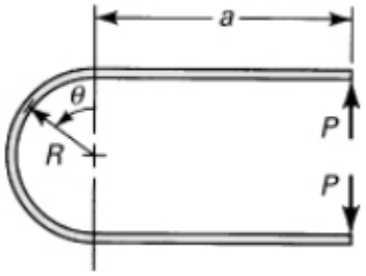
Homework 12

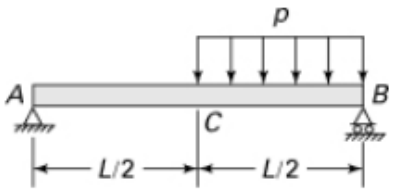
1) A cantilever beam of constant AE and EI is loaded as shown. Determine the vertical and horizontal deflections and the angular rotation of the free end, considering the effects of normal force and bending moment. Employ Castigliano's theorem.



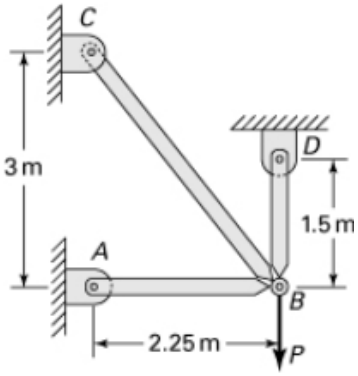
2) If a force P is applied to the steel spring (of uniform flexural rigidity) shown, determine the increase in the distance between the ends. Use Castigliano's theorem.



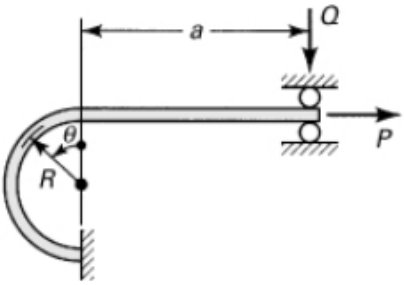
3) A beam is loaded and supported as shown. Apply Castigliano's theorem to find the deflection at point C.



4) A load P is carried at joint B of a structure consisting of three bars of equal axial rigidity AE, as shown. Apply Castigliano's theorem to determine the force in each bar.



5) A steel rod of constant flexural rigidity is shown. For force P applied at the simply supported end, derive a formula for roller reaction Q. Apply Castigliano's theorem.



6) A beam is supported and loaded as shown. Use Castigliano's theorem to determine the reactions.