بسمه تعالی

تمرین تحویلی مقاومت ۲

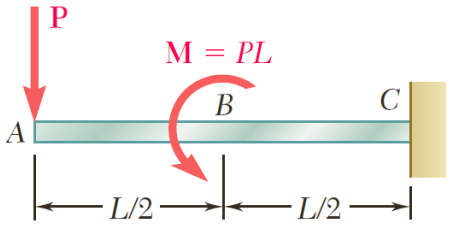
سری دوم

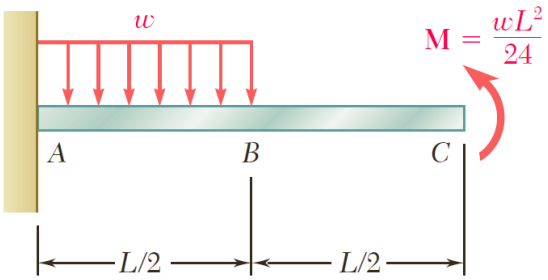
استاد درس: دکتر حسینی

دانشگاه شاهرود

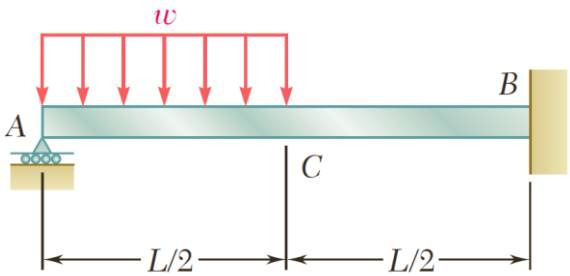
دانشکده مهندسی مکانیک

1 For the cantilever beam and loading shown, determine the slope and deflection at the free end .(use superposition method)





2 For the uniform beam shown, determine (*a*) the reaction at *A*, (*b*) the reaction at *B*. (use superposition method)



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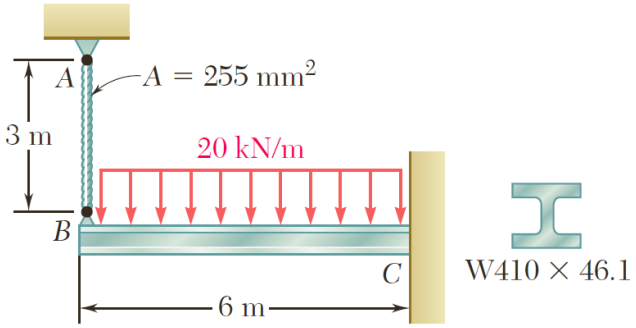
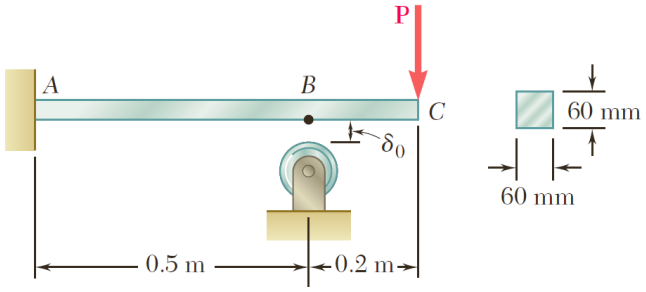
3 The cantilever beam *BC* is attached to the steel cable *AB* as shown. Knowing that the cable is initially taut, determine the tension in the cable caused by the distributed load shown. Use *E* = 200 GPa.



4 Before the load **P** was applied, a gap, δ= 0.5 mm, existed between the cantilever beam *AC* and the support at *B*. Knowing that *E*= 200 GPa, determine the magnitude of **P** for which the deflection at *C* is 1 mm.



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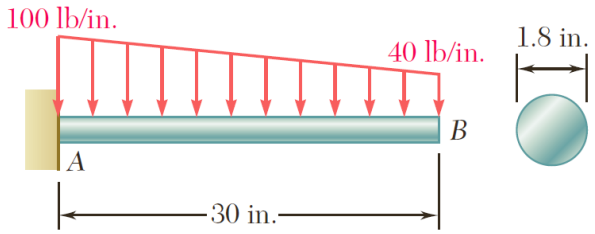
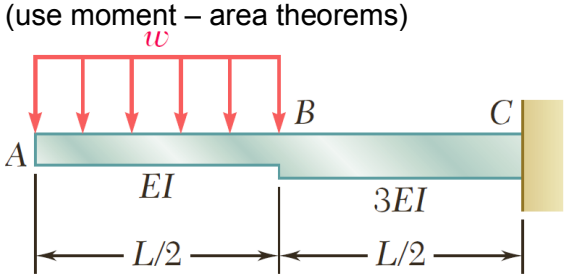
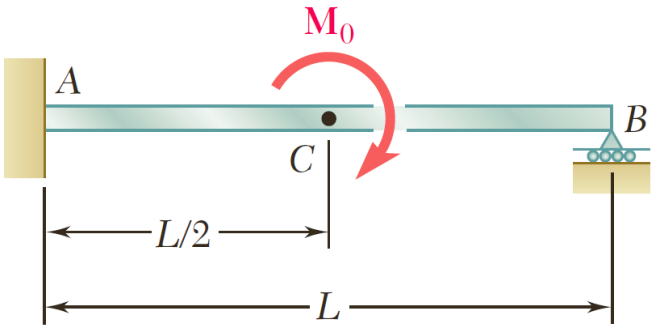
5 For the cantilever beam and loading shown, determine (*a*) the slope at point *B*, (*b*) the deflection at point *B*.
Use $E = 29 * 10^6$ psi. (use moment – area theorems)



6 For the cantilever beam and loading shown, determine (a) the slope at point *C*, (*b*) the deflection at point *C*.
(use moment – area theorems)



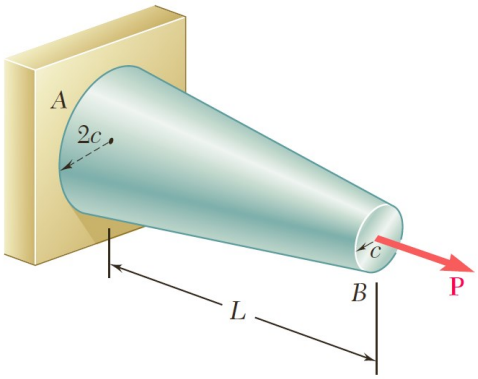
7 For the beam and loading shown, determine the reaction at the roller support. (use moment – area theorems)



8 Show by integration that the strain energy of the tapered rod AB is

$$U = \frac{1}{4}\frac{P^2 L}{E A_{\min}}$$

where $A_{\min}$ is the cross-sectional area at end B.



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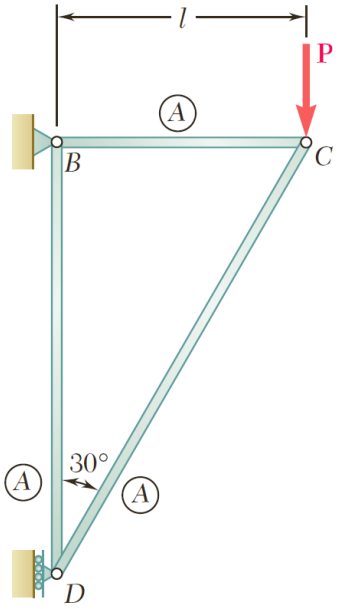
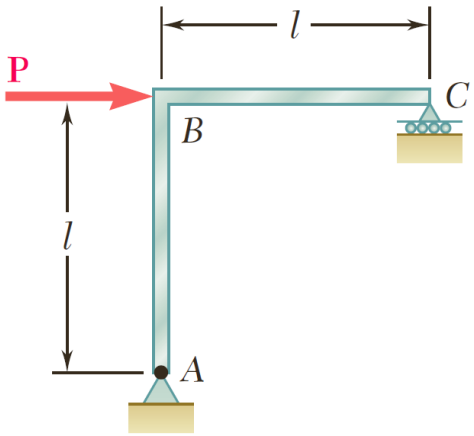
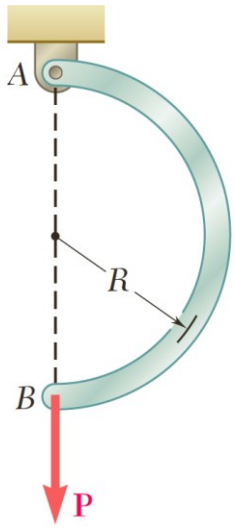
9 In the truss shown, all members are made of the same material and have the uniform cross-sectional area indicated. Determine the horizontal and vertical displacement of point C.



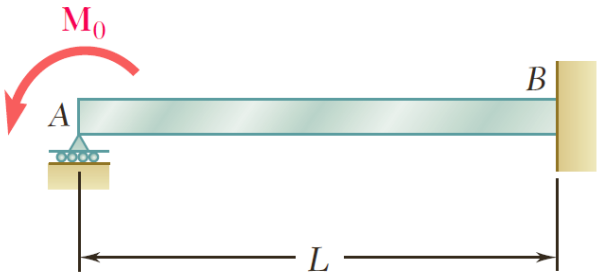
10 Two rods AB and BC of the same flexural rigidity EI are welded together at B. For the loading shown, determine (a) the deflection of point C, (b) the slope of member BC at point C.



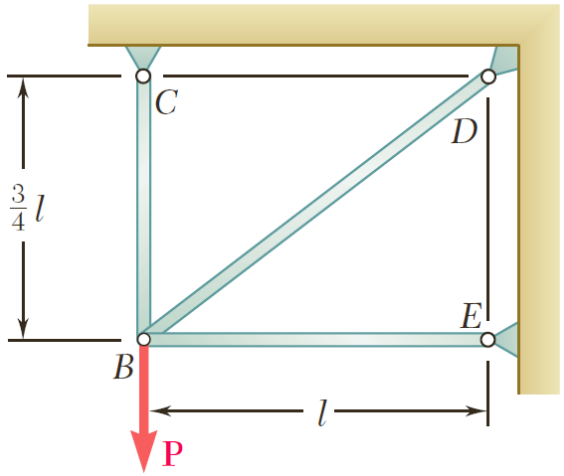
11 For the uniform rod and loading shown and using Castigliano's theorem, determine the deflection of point *B*.



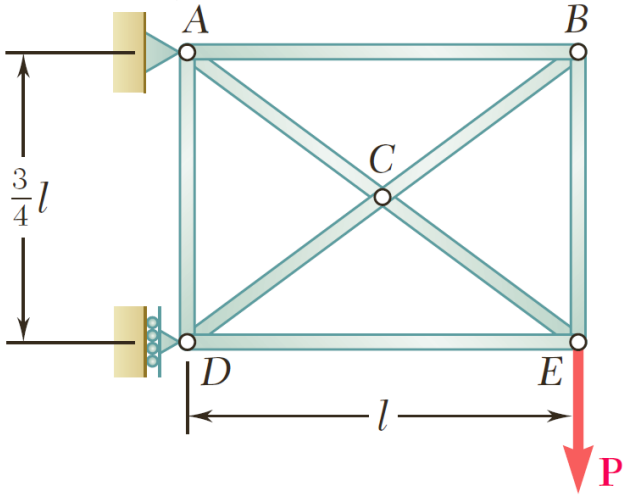
12 Determine the reaction at the roller support and draw the bending-moment diagram for the beam and loading shown. (using energy method)



13 Three members of the same material and same cross-sectional area are used to support the loading **P.** Determine the force in member *BC*.



14 Knowing that the eight members of the indeterminate truss shown have the same uniform cross-sectional area, determine the force in member *AB*.



15

An eccentric load is applied at a point 22 mm from the geometric axis of a 60-mm-diameter rod made of a steel for which σ_Y = 250 MPa and E = 200 GPa. Using the allowable-stress method, determine the allowable load **P.**