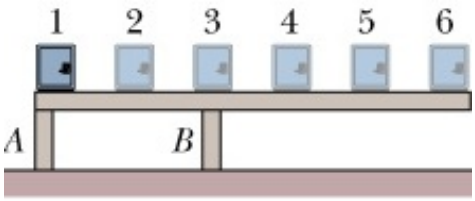
PHYS 320 Analytical Mechanics
Fall 2016

Homework Assignment # 07 - Due Tuesday, 25 Sept 2018

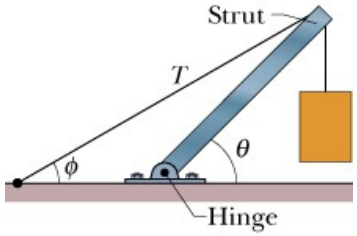
- ☞ Read Taylor Sections 2.3 - 2.4

- ✪ Taylor Problems: None
- ✪ Additional Questions:

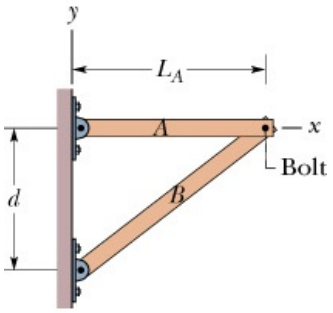
I. In the figure, a rigid beam is attached to two posts that are fastened to a floor. A small but heavy safe is placed at the six positions indicated, in turn. Assume that the mass of the beam is negligible compared to that of the safe. (a) Rank the positions according to the force on post A due to the safe, greatest compression first, greatest tension last, and indicate where, if anywhere, the force is zero. (b) Rank them according to the force on post B.



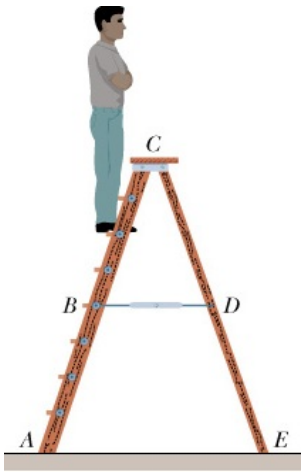
II. The uniform strut in the figure is in equilibrium. A concrete mass of *225 kg* hangs from the end of the strut of mass *45.0 kg*. For angles $\varphi = 30.0^o$ and $\theta = 45.0^o$, find (a) the tension T in the cable and the (b) horizontal and (c) vertical components of the force on the strut by the hinge, $\vec{R}$.



III. Two uniform beams A and B are attached to a wall with hinges and loosely bolted together. Beam A has length $L_A = 2.40\ m$ and mass *54.0 kg*; beam B has mass *68.0 kg*. The two hinge points are separated by a distance $d = 1.80\ m$. In unit vector notation, what is the force on (a) beam A due to its hinge, (b) beam A due to the bolt, (c) beam B due to its hinge, and (d) beam B due to the bolt?



IV. For the stepladder shown, sides *AC* and *CE* are each *2.44 m* long and hinged at *C*. Bar *BD* is a tie-rod *0.762 m* long, halfway up. A man weighing *854 N* climbs *1.80 m* along the ladder . Assuming that the floor is frictionless and neglecting the mass of the ladder, find (a) the tension in the tie-rod and the magnitudes of the forces on the ladder from the floor at (b) point *A* and (c) point *E*.



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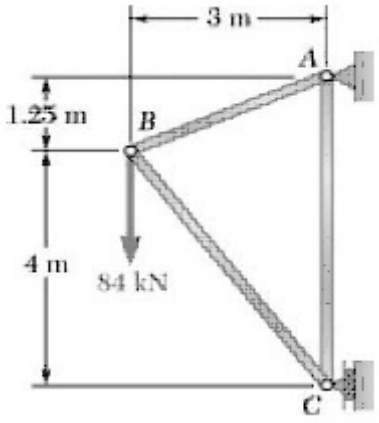
V. Using the method of joints, find the force in each member of the truss to the right. State whether each member is in tension or compression.



VI. Using the method of joints, find the force in each member of the truss to the right. State whether each member is in tension or compression.