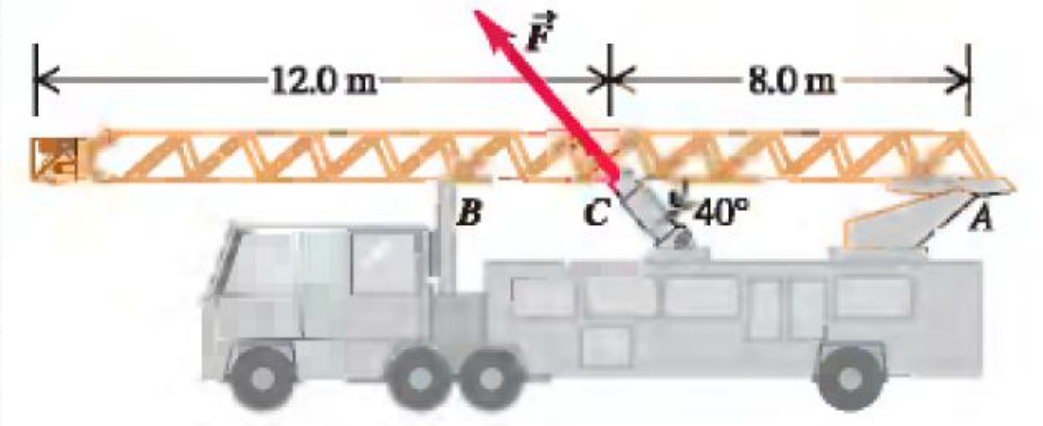
CSD2301 Practice
16. **Static Equilibrium**

LIN QINJIE

Practice Question 1

A ladder carried by a fire truck is 20.0 m long. The ladder weighs 2800 N and its center of gravity is at its center. The ladder is pivoted at one end (A) about a pin. Ignore friction torque at the pin. The ladder is raised into position by a force applied by a hydraulic piston at C. Point C is 8.0 m from A, and the Force F exerted by the piston makes and angle of 40° with the ladder. What magnitude must F have to just lift the ladder off the support bracket at B?

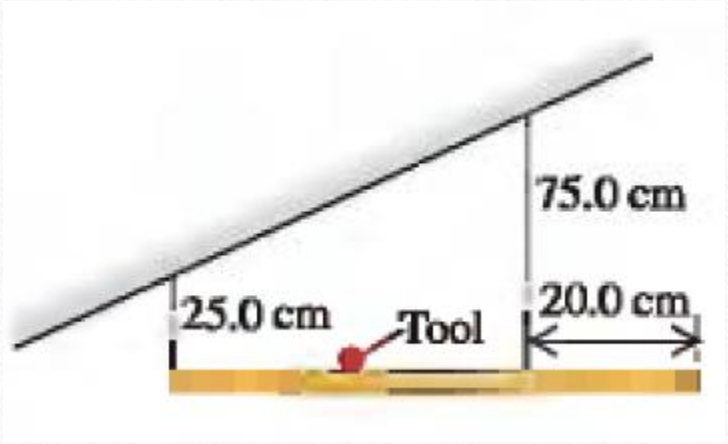


Practice Question 2

Two people carrying a heavy electric motor by placing it on a light board 2.00 m long. One person lifts at one end with a force of 400 N, and the other lifts the opposite end with a force of 600 N. (a) Assume the board is massless, what is the weight of the motor, and where along the board is the center of gravity location? (b) Suppose the board weighs 200 N, with the center of gravity at its center, and the two people exert the same forces as before. What is the weight of the motor in this case, and where is the center of gravity located?

Practice Question 3

A 60.0 cm uniform, 50.0 N shelf is supported horizontally by two vertical wires attached to the sloping ceiling as shown. A very small 25.0 N tool is placed on the shelf midway between the points where the wires are attached to it. Find the tension in each wire.



Practice Question 4

Find the tenson T in the cable and the magnitude and direction of the force exerted on the strut by the pivot in the diagram as shown. Let the weight of the crate be w. The strut is uniform and also has the same weight, w.

Practice Question 5

Suppose that you can lift no more than 650 N unaided. (a) How much can you lift using a 1.4 m wheelbarrow that weighs 80.0 N and whose center of gravity is 0.50 m from the center of the wheel? The center of gravity of the load carried in the wheelbarrow is also 0.50 m from the center of the wheel. (b) Where does the force come from to enable you to lift more than 650 N using the wheelbarrow?