

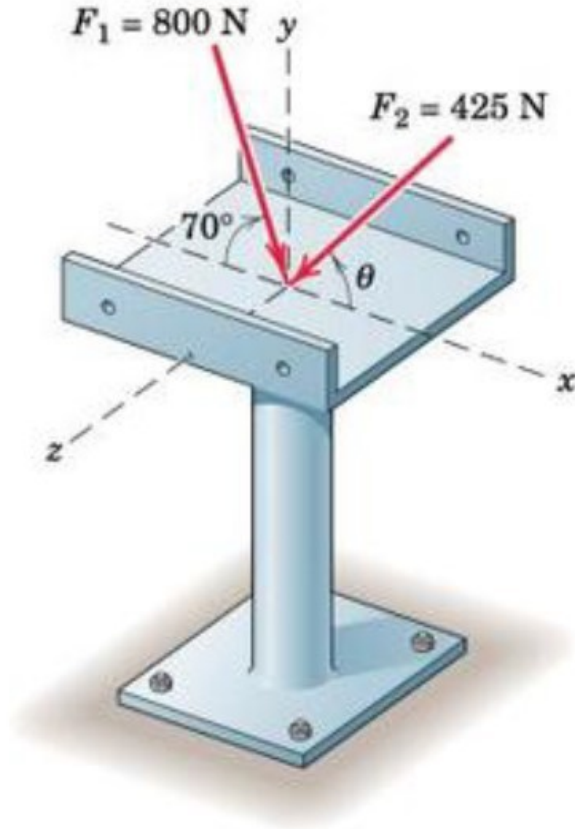
ME 201 STATICS



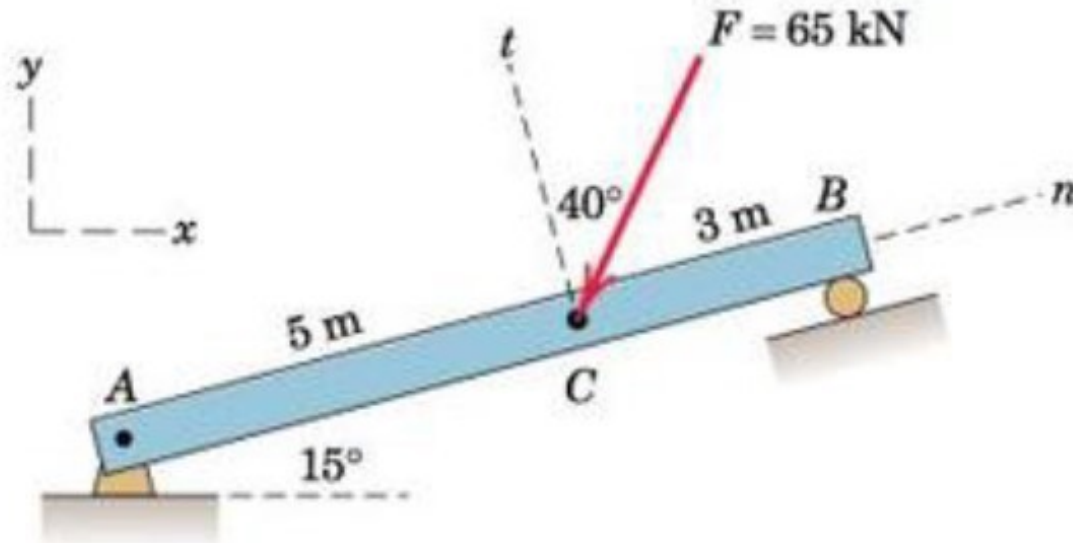
PROBLEM HOUR I

FORCE SYSTEMS

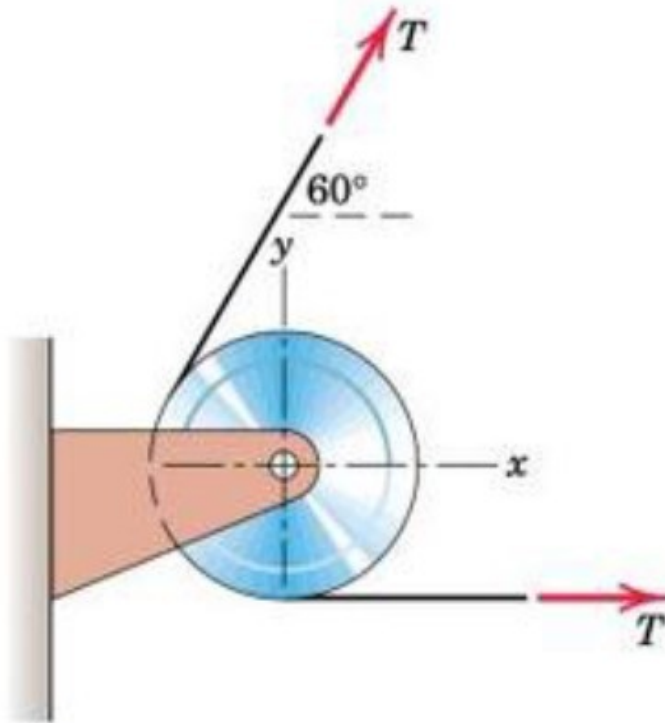
Q1) Two forces are applied to the construction bracket as shown. Determine the angle θ which makes the resultant of the two forces vertical. Determine the magnitude R of the resultant.



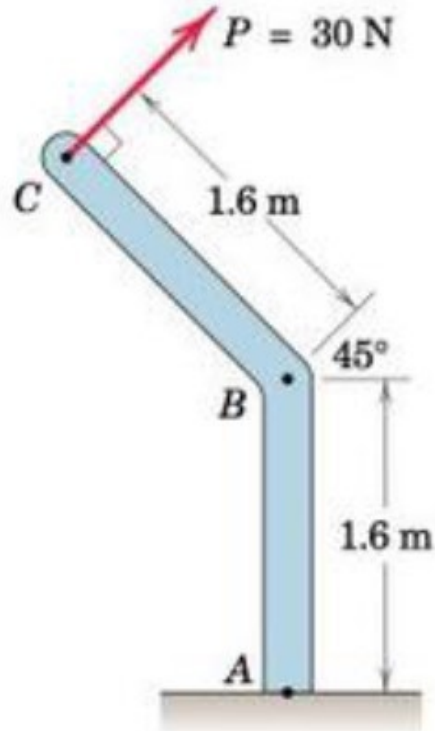
Q2) Determine the x - y and n - t components of the 65-kN force F acting on the simply-supported beam.



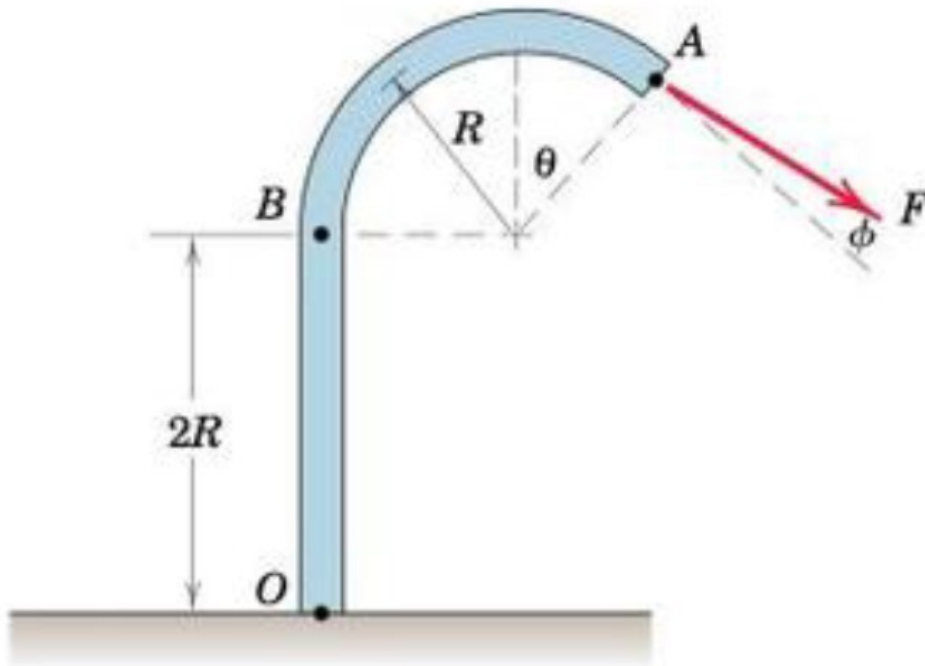
Q3) If the equal tensions T in the pulley cable are 400 N, express in vector notation the force $\mathbf{R}$ exerted on the pulley by the two tensions. Determine the magnitude of $\mathbf{R}$.



Q4) The 30 N force $\mathbf{P}$ is applied perpendicular to the portion BC of the bent bar. Determine the moment of $\mathbf{P}$ about point B and about point A .

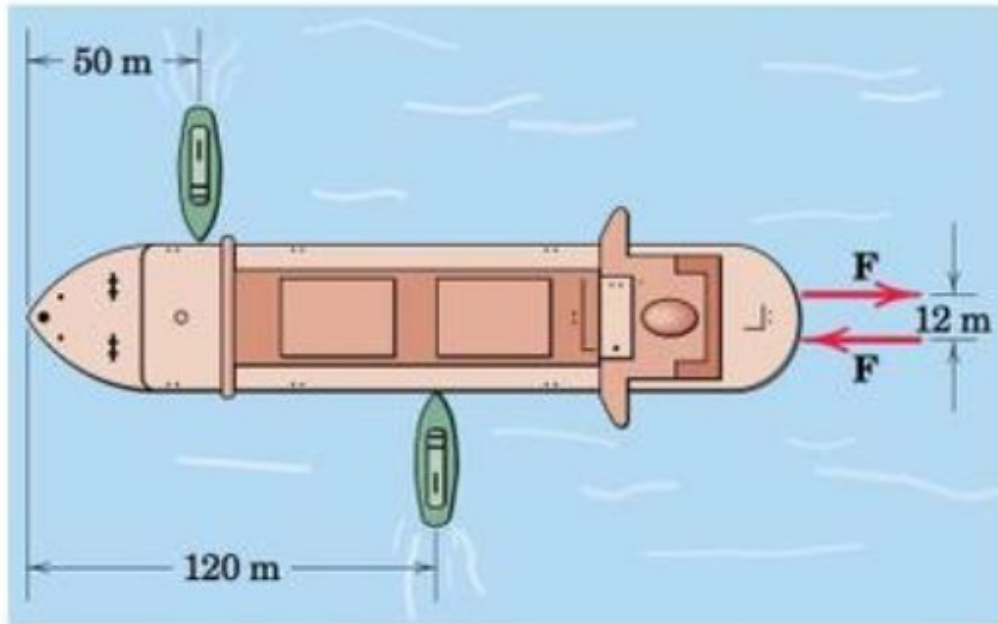


Q5) Determine the general expression for the moments of F about (a) point B and (b) point O . Evaluate your expressions for $F=750$ N, $R=2.4$ m, $\theta=30^\circ$, and $\phi=15^\circ$.



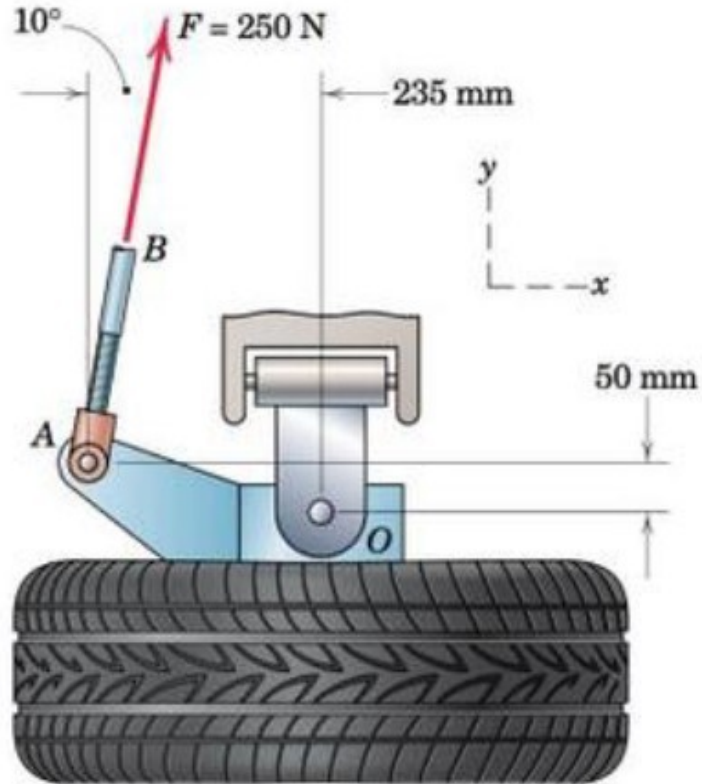
Q6)

Each propeller of the twin-screw ship develops a full-speed thrust of 300 kN. In maneuvering the ship, one propeller is turning full speed ahead and the other full speed in reverse. What thrust P must each tug exert on the ship to counteract the effect of the ship's propellers?



Q7)

The tie-rod AB exerts the 250-N force on the steering knuckle AO as shown. Replace this force by an equivalent force-couple system at O .



Q8) A commercial airliner with four jet engines, each producing 90 kN of forward thrust, is in a steady, level cruise when engine number 3 suddenly fails. Determine and locate the resultant of the three remaining engine thrust vectors. Treat this as a two-dimensional problem.

