

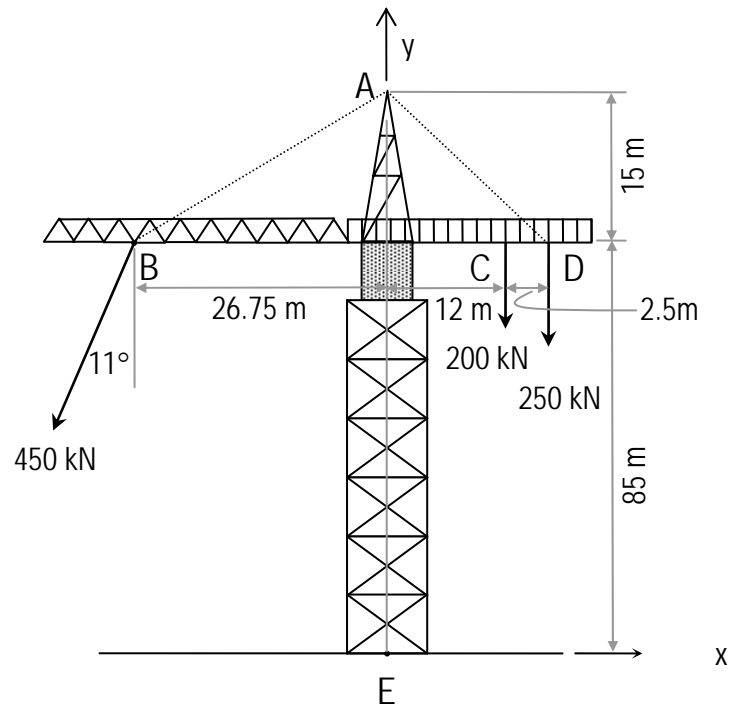
ENDS 231: Practice Quiz 1

Note: A one page (one sided) crib sheet is allowed during the quiz, along with a silent calculator.

Clearly show your work and answer.

The construction crane has ballast weights at points C and D in order to lift the force at point B. In addition, there are cables that support the horizontal boom at points B and D.

- If the force in cable AB is known to be 799.5 kN in tension, what are the resultant component forces at point B from the two forces (*size and direction*)?
- What is the resultant force of the two forces at point B? (*size and angle to +x axis*)
- What is the *resultant moment* of the applied force at point B and the counterweights at C and D about the base of the tower at E? Do the counterweights need to be larger, smaller or kept the same if the tower is not to tip?
- [*some short question from the text material*]



Answers – Not provided on actual quiz!

- $R_x = 611.4 \text{ kN}$ (right), $R_y = -50.7 \text{ kN}$ (down)
- $R = 613.5 \text{ kN}$, $\theta = -4.7$ or 355.2°
- $M_{R@E} = 13,089 \text{ kN-m}$ \therefore the counter weights need to be *larger*

Disclaimer: Answers have NOT been painstakingly researched.