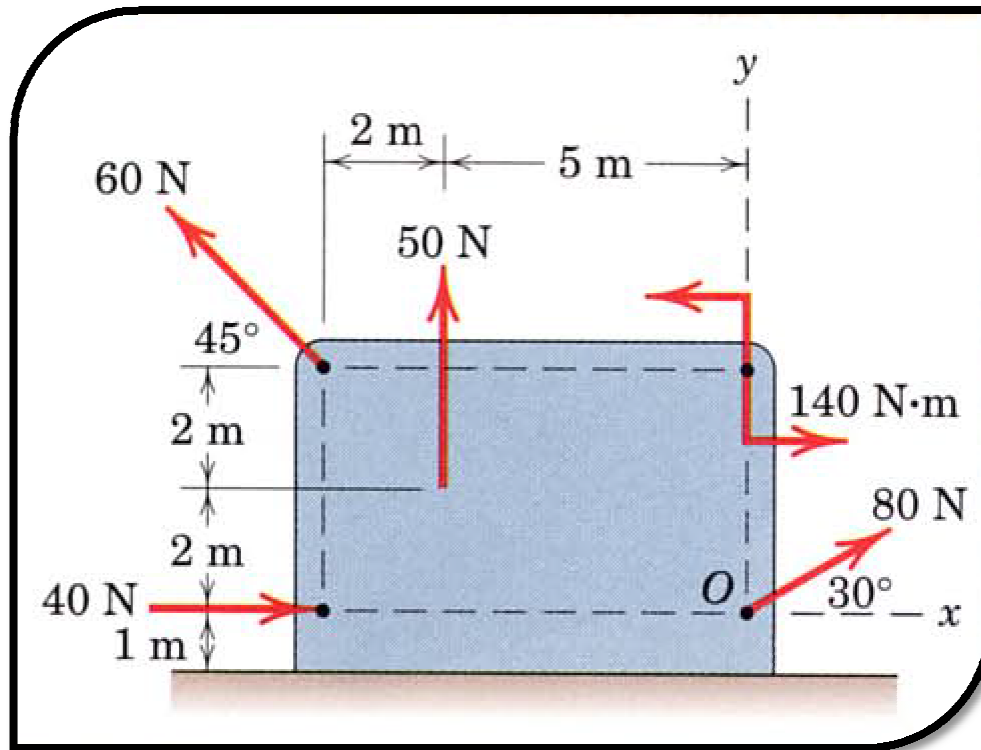


Tutorial no.: 2**Q.1:**

Determine the resultant of the four forces and one couple which act on the plate shown.

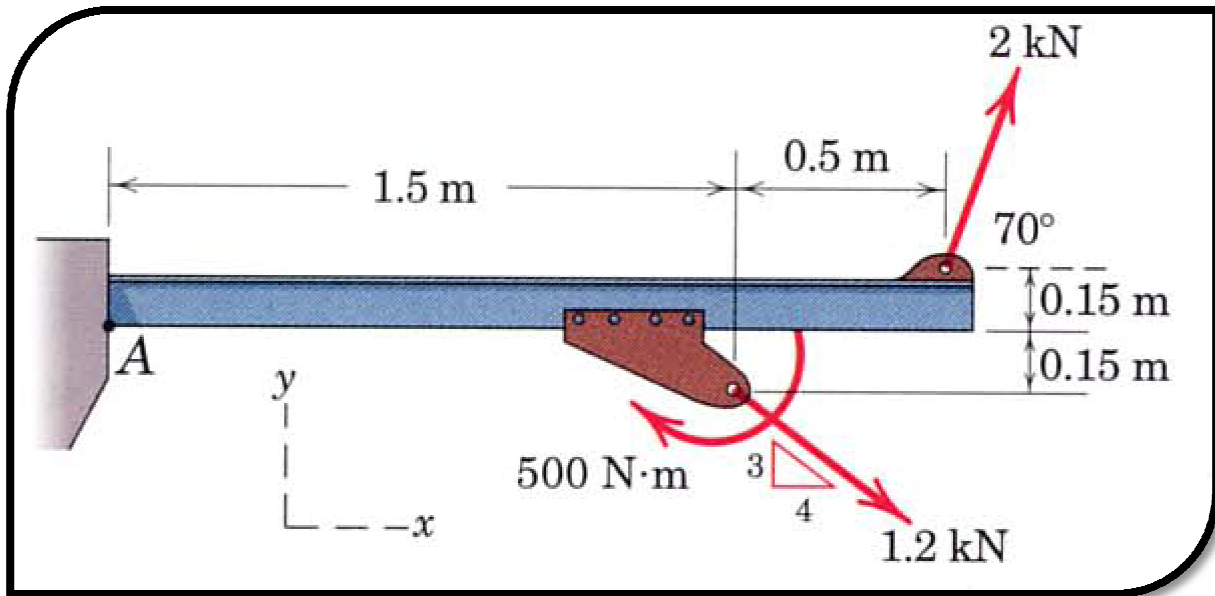


Q2:

The flanged steel cantilever beam with riveted bracket is subjected to the couple and two forces shown, and their effect on the design of the attachment at A must be determined. Replace the two forces and couple by an equivalent couple M and resultant force \mathbf{R} at A.

$$\text{Ans. } \mathbf{R} = 1.644\mathbf{i} + 1.159\mathbf{j} \text{ kN}$$

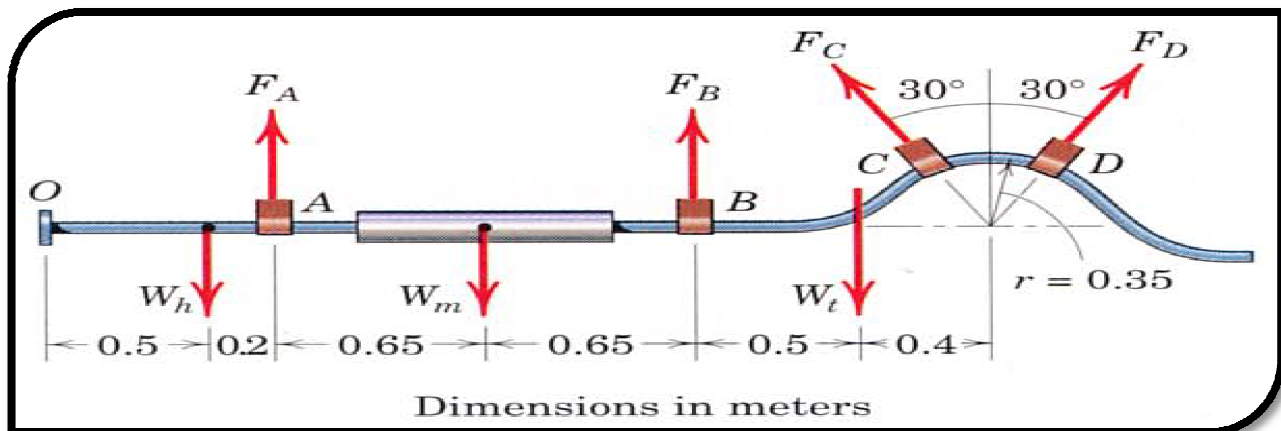
$$M_A = 2.22 \text{ kN}\cdot\text{m CCW}$$



Q3:

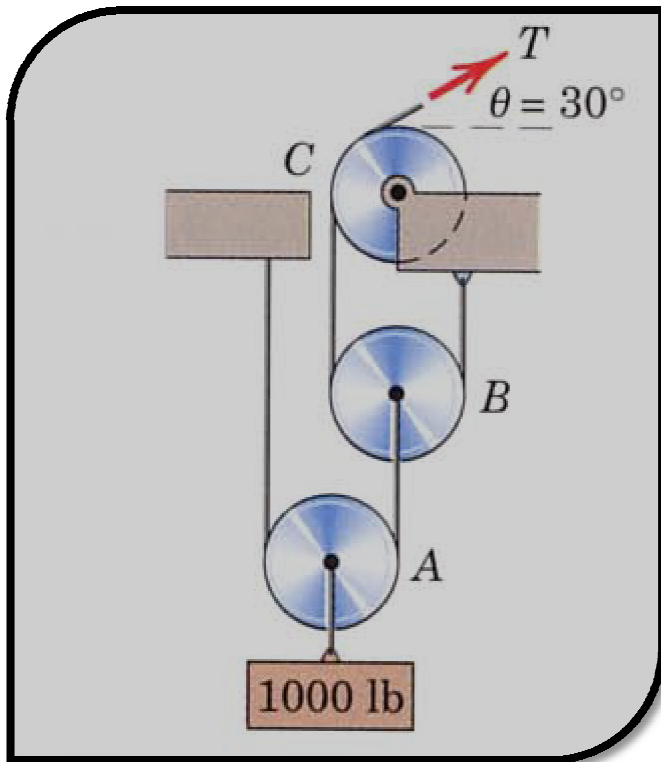
An exhaust system for a pickup truck is shown in the figure. The weights W_h , W_m , and W_t of the headpipe, muffler, and tailpipe are 10, 100, and 50 N, respectively, and act at the indicated points. If the exhaust-pipe hanger at point A is adjusted so that its tension F_A is 50 N, determine the required forces in the hangers at points B, C, and D so that the force-couple system at point O is zero. Why is a zero force-couple system at O desirable?

Ans. $F_B = 98.9 \text{ N}$, $F_C = F_D = 6.42 \text{ N}$

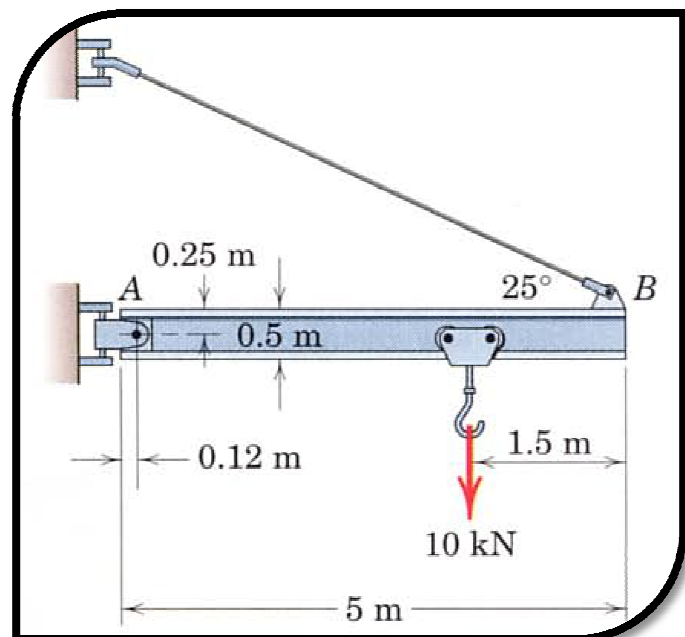


Q4:

Calculate the tension T in the cable which supports the 1000-lb load with the pulley arrangement shown. Each pulley is free to rotate about its bearing, and the weights of all parts are small compared with the load. Find the magnitude of the total force on the bearing of pulley C .



Q5:



Determine the magnitude T of the tension in the supporting cable and the magnitude of the force on the pin at A for the jib crane shown. The beam AB is a standard 0.5-m I-beam with a mass of 95 kg per meter of length.