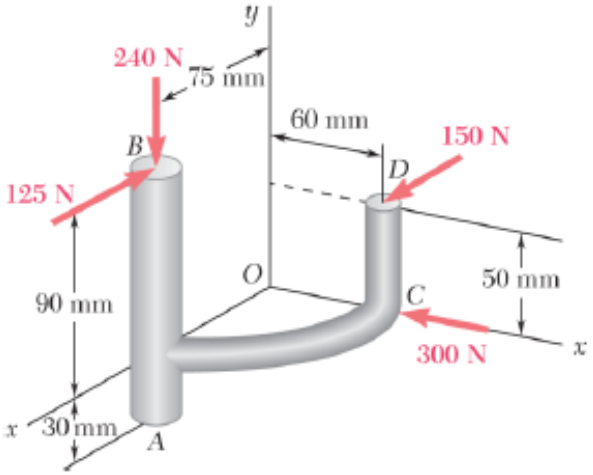
ES 208 Mechanics

Tutorial 3

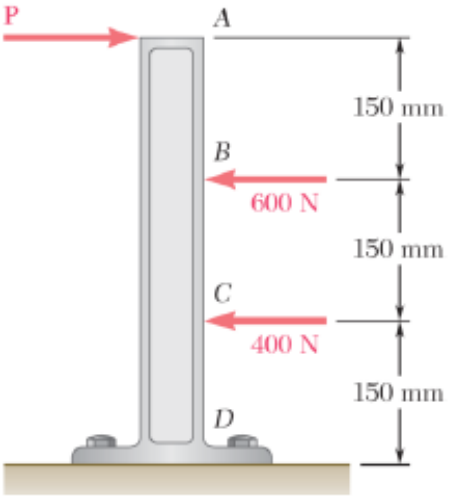
All problems are from Beer and Johnston's book



PROBLEM 3.119

A machine component is subjected to the forces shown, each of which is parallel to one of the coordinate axes. Replace these forces with an equivalent force-couple system at A.

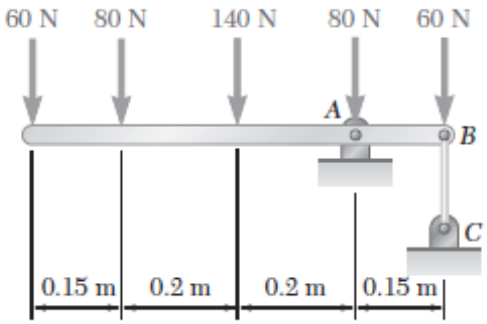
$$\mathbf{F} = -300\mathbf{i} - 240\mathbf{j} + 25\mathbf{k}$$
$$\mathbf{M} = -3\mathbf{i} + 13.5\mathbf{j} + 9\mathbf{k}$$



PROBLEM 3.157

Three horizontal forces are applied as shown to a vertical cast iron arm. Determine the resultant of the forces and the distance from the ground to its line of action when (*a*) $P = 200$ N, (*b*) $P = 2400$ N, (*c*) $P = 1000$ N.

$a) F = -800\text{N}, y = 187.5\text{mm}$
$b) F = 1400\text{N}, y = 600\text{mm}$
$c) F = 0$

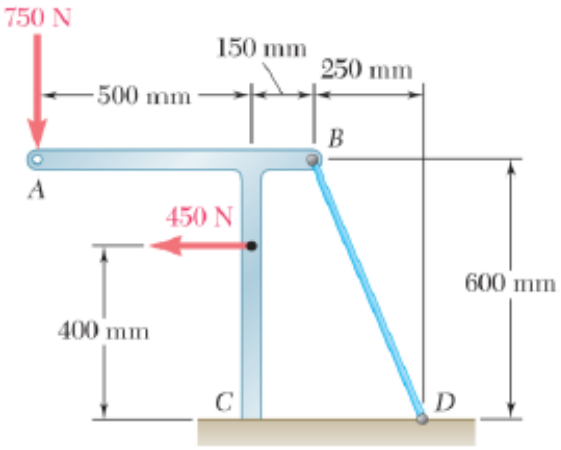


PROBLEM 4.4

For the beam and loading shown, determine (*a*) the reaction at *A*, (*b*) the tension in cable *BC*.

$A_y = 980\text{N}$

$F_{BC} = 560\text{N}$



PROBLEM 4.46

Knowing that the tension in wire *BD* is 1300 N, determine the reaction at the fixed support *C* of the frame shown.

$C_x = -50\text{N}, C_y = 1950\text{N}, M_c = 75\text{Nm CW}$