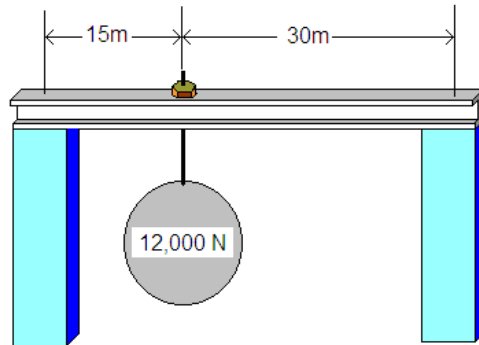# Physics I

Statics Problems, Beams

Equilibrium equations $\sum F = 0$ and $\sum \tau = 0$ Where $\tau = Fr\sin\angle_F^r$

Problem 1.- The weight of a beam is 10,000 N and it is supporting a load of 12,000 N as shown in the figure. Calculate the reaction forces supplied at the supports on both ends:


Problem 2.- The following arrangement of meter stick, unknown object and slotted weights is in equilibrium hanging from a string. Calculate the mass of the unknown object if the mass of the meter stick is 0.035 kg (with its center of mass at the 50cm mark) and the mass of the slotted weights is 0.150 kg.
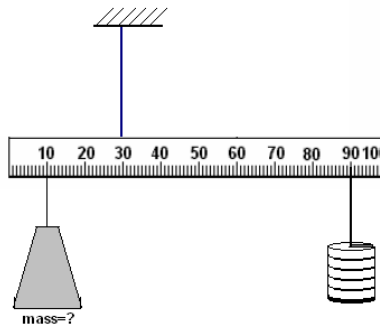

Problem 3.- The mass of the meter stick is 0.035 kg. Calculate the force on each supporting string if the center of mass is at the 50cm mark.
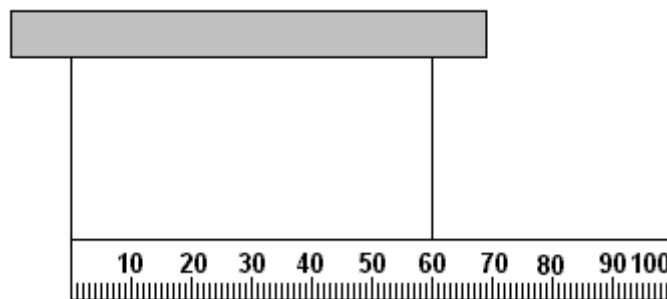
Problem 4.- The meter stick is in equilibrium as shown in the figure.
Calculate the mass of the meter stick knowing that its center of mass is at the 50cm mark, and the slotted weights with the hanger have a mass of 90g.
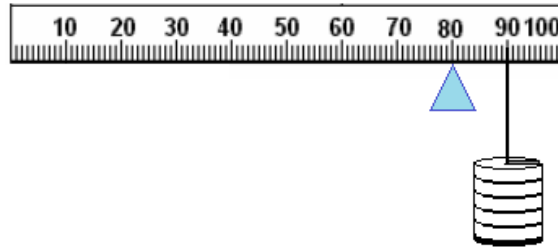
Problem 5.- The crane in the figure is in equilibrium (sum of forces is zero and sum of torques also zero). Find the counterweight on the left side of the crane and the vertical force on the support. The weight of the hoist and load is 1800 N. Ignore the weight of the beam.
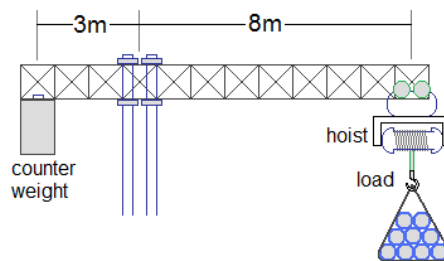
Problem 6.- Find the vertical force on the left support of the crane shown in the figure. The weight of the hoist is 2,100 N and the weight of the beam is 3,500 N.