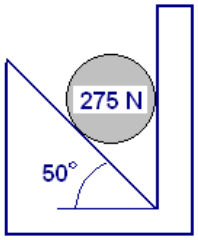
Physics I

Other Statics Problems

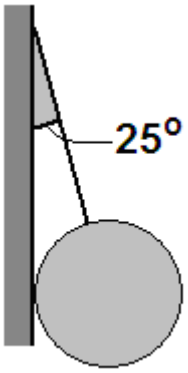
Equilibrium equations $\sum F = 0$ and $\sum \tau = 0$ Where $\tau = Fr\sin\angle_F^r$

Law of sines $\dfrac{F_1}{\sin\theta_1} = \dfrac{F_2}{\sin\theta_2} = \dfrac{F_3}{\sin\theta_3}$

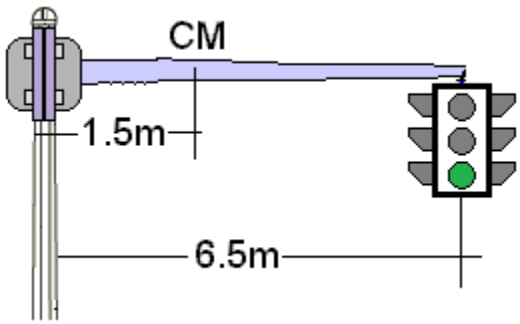
Problem 1.- The sphere shown in the picture has a weight of 275 N and is resting against two smooth surfaces (neglect friction). Find the forces applied by the two surfaces.



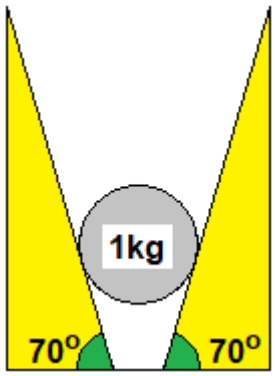
Problem 2.- The figure shows a 1500-kg sphere leaning against a frictionless wall and held in place by a steel cable. Find the force that the wall applies on the sphere.



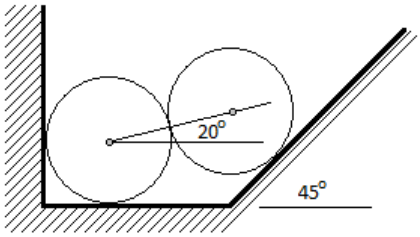
Problem 3.- The mass of the traffic light is 45kg and the mass of the supporting pole is 125kg. Notice that the center of mass of the pole is not in the middle because it has a tapered shape. Calculate the torque needed to keep the whole thing in equilibrium.



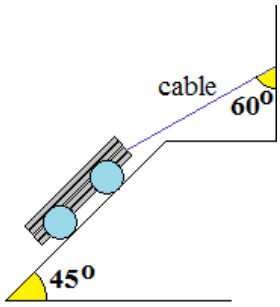
Problem 4.- Calculate the forces that the 1kg-sphere produces on the frictionless walls:



Problem 5.- Calculate the force between the sphere on the left and the vertical wall. Each sphere has 100kg of mass and all the surfaces are smooth (neglect friction).

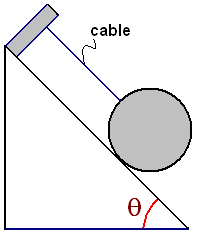


Problem 6.- Calculate the force in the cable if the weight of the cart is mg = 1250 N and there is no friction between the wheels and the inclined surface.



Problem 7.- The figure shows a 1800-kg sphere leaning against a smooth surface without friction and kept in place by a cable parallel to the inclined plane.

Draw the free body diagram of the sphere and calculate the force in the cable and the normal force if $\theta = 48^{\circ}$



Problem 8.- The figure shows three cylinders with radii 30cm inside a pipe with 120cm radius. If each cylinder weighs 81N calculate the force between the central cylinder and the pipe. All surfaces are smooth (neglect friction).