WORKSHEET 1: EQUILIBRIUM PROBLEMS

I. FIRST CONDITION OF EQUILIBRIUM:

1. Ms. Jones has attached a sign that has a weight of 495 N to a wall outside her office, as shown at right. Determine the thrust force exerted by the rod.

2. It is found that the system at right comes to equilibrium with θ equal to $40°$ when F = 200 N. How much does the ball weigh?

3. Three men are pulling on ropes attached to a tree the first man exerts a force of 6.0 N north, the second a force of 35 N east, and the third 40 N to the south. (a) Find the magnitude of the resultant force on the tree. (b) What is the magnitude of the equilibrant force?

4. A boy and a girl carry a 118 N bucket of water by holding the ends of a rope with the bucket attached at the middle. If there is an angle of $100.0°$ between the two segments of the rope, what is the tension in each part of the rope?

5. A traffic light is supported by two wires, as shown at right. If the maximum tension in each wire is 750 N and the angle between the wires is $80°$, what is the maximum weight of the light they can support?
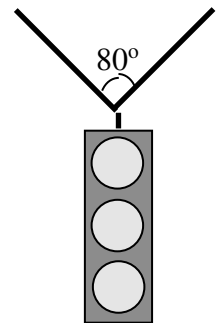
6. A 20000 N car is parked on an incline that makes an angle of $30.0°$ with the horizontal. If the maximum force the brakes can withstand is 12000 N, will the car remain at rest?

7. A 19600 N car is to be held on a $20.0°$ incline by a rope in which the maximum tension is 8000 N. Will the rope support the car?
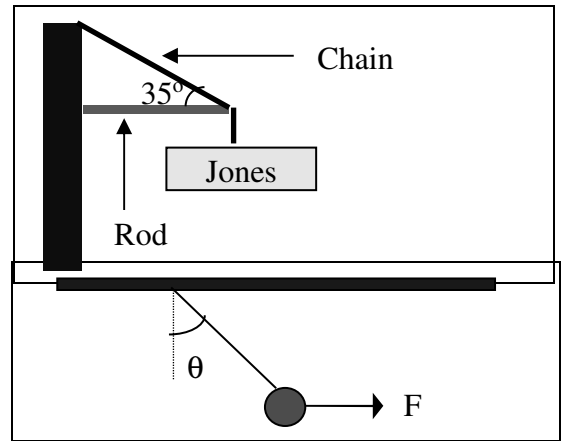
1. 707 N	2. 238 N	3. 50.2 N, 50.2 N	4. 91.8 N
5. 1150 N	6. 330 N	7. 9999 N, yes	8. 6703 N, yes