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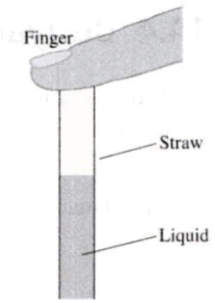
Physics 2C, Winter 2020

Reading Assignment due Tuesday 1/7: Submit via Gradescope by 11:30am

1. Suppose you have a glass of water on the table, and a straw. If you put the straw in the water, hold your finger on the top of the straw to create a seal, and take the straw out (with your finger still covering the top), then some water will remain in the straw, even if you hold the straw in the air (so it looks like the water is "floating," since it could easily just fall out the bottom of the straw onto the floor).



   (a) Why does the water stay in the straw, rather than fall down?

   (b) Draw a free-body diagram (FBD) for the water in the straw (as you're holding the straw in front of you, so the water seems to be defying gravity). There should be three forces on the water (these three forces all sum to zero, if the water is at rest and remains at rest). Two of the forces from your FBD should be pressures.

2. Look at Figure 14.16(a) on page 368 of the textbook. It takes a force of magnitude F_1 to support the car in equilibrium. If you push in the piston even farther down (so that h increases), and then see how much force it takes to suppor the car in equilibrium, would this be greater than F_1 or the same as F_1?

3. Knight Exercise 14.21. In particular:

   (a) Draw a FBD for all forces on the block in Aluminum.

   (b) Find the tension in the string.

For extra practice (not due): From Chapter 14 of Knight, 4th edition: Conceptual Questions: 1-9. Exercises: 1, 3, 6, 9, 12, 16, 19, 23, 25.