

PHYS 2C

Discussion Section – 1/07

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Before we Begin:

- Try and **sit next to a student you don't know**
- Introduce yourselves and find out where the other student is from
- We will work through 3 Problems today,
in groups of two students first and then discuss the solution

About Me

- From **Bangalore, India**



About Me

- 2nd year Physics PhD student
- MS in Electrical and Computer Engineering
 - Specializing in Intelligent Systems, Robotics and Controls
- Currently work with Prof. David Tytler (CASS)
- Research Interests:
 - Machine Learning
 - Big Data Astronomy
 - Scientific Computation

Why should I attend?

Plan for discussion sections

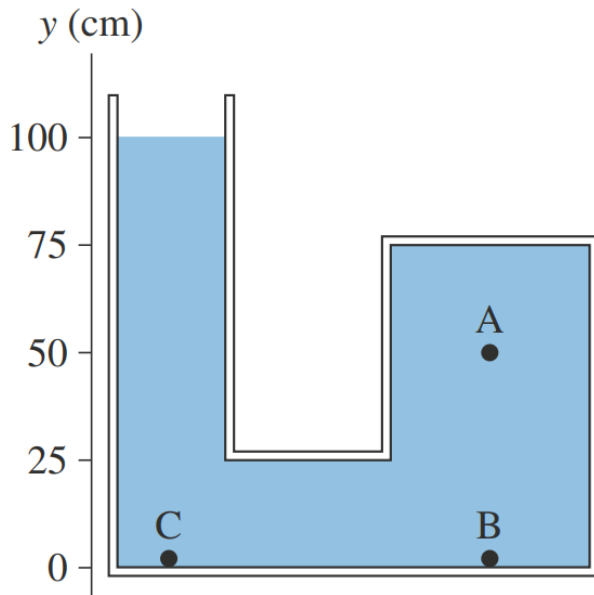
- Solve 2 – 4 problems
 - Textbook problems
 - Problems similar to upcoming quiz questions
 - Previous quarter discussion problems
 - **Your suggestions!** (Email me in advance)
- First, work in groups (~4-5 minutes)
- I will work through the problem in detail
- Time for questions

Final bit of logistics

- Discussion Attendance – 5% of overall grade
- Each week, sign the sheet that will be passed around.
- **Return the sheet to me after all have signed**
- Verify all previous attendance has been counted and rectify any issues
- Please sign for yourself ONLY.
 - I may randomly check
- **Email policy: Use Piazza!**
 - Set post visibility to Instructor only if needed

Discussion Problem 1

Exercise Problem 12 – Chapter 14 - Textbook



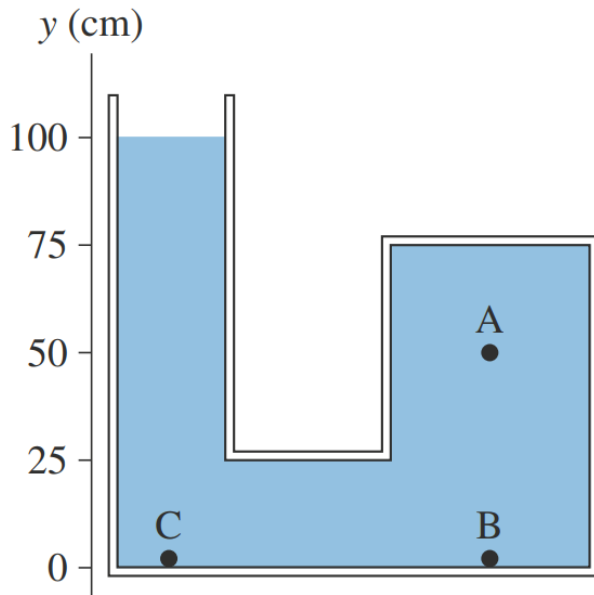
The container shown here, is filled with oil ($\rho_{oil} = 900 \text{ kg} \cdot \text{m}^{-3}$).

It is open to the atmosphere on the left.

- What is the pressure at point A?
- What is the pressure difference between points A and B? Between points A and C?

Discussion Problem 1- Solution

Exercise Problem 12 – Chapter 14 - Textbook



The container shown here, is filled with oil ($\rho_{oil} = 900 \text{ kg} \cdot \text{m}^{-3}$).

It is open to the atmosphere on the left.

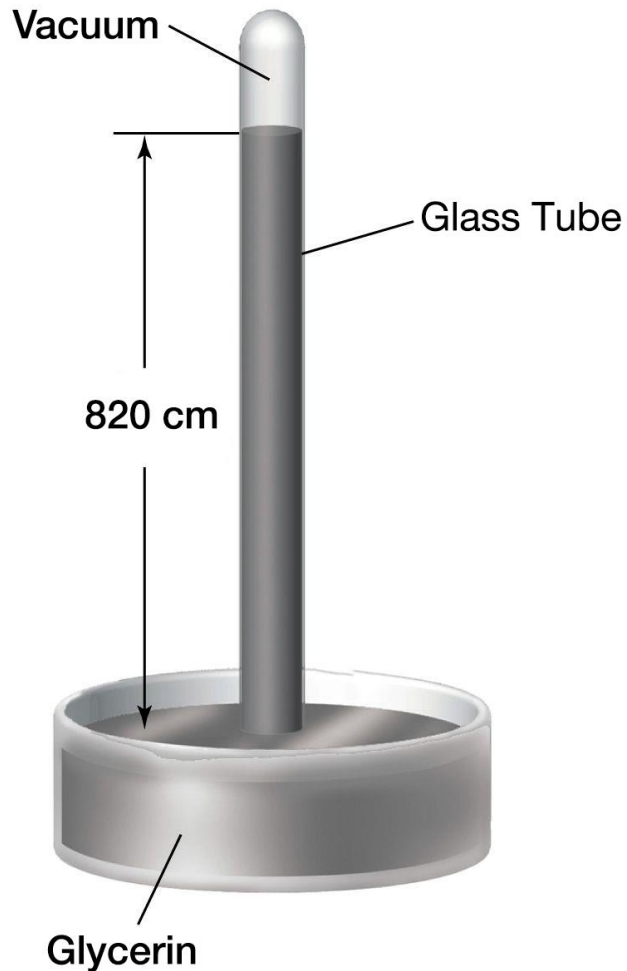
- What is the pressure at point A?
- What is the pressure difference between points A and B? Between points A and C?

106 kPa

4.4 kPa

Discussion Problem 2

Estimate Density of Glycerin

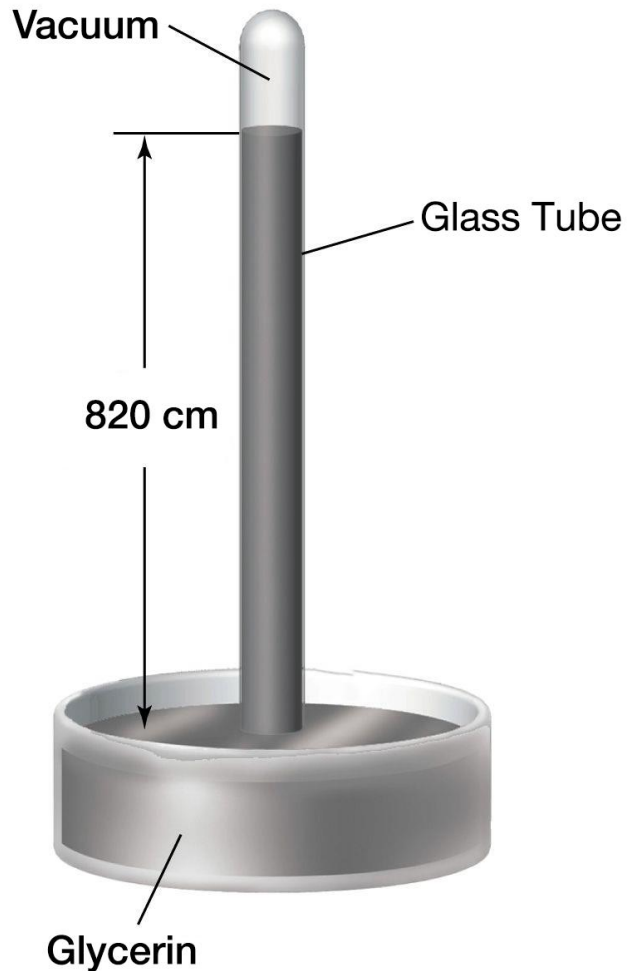


The figure shows a column of Glycerin suspended in a glass tube.

Assuming the apparatus is at sea level, estimate the density of Glycerin.

Discussion Problem 2 - Solution

Estimate Density of Glycerin



The figure shows a column of Glycerin suspended in a glass tube.

Assuming the apparatus is at sea level, estimate the density of Glycerin.

$$\rho_{Glycerin} = 1260 \text{ kg} \cdot \text{m}^{-3}$$

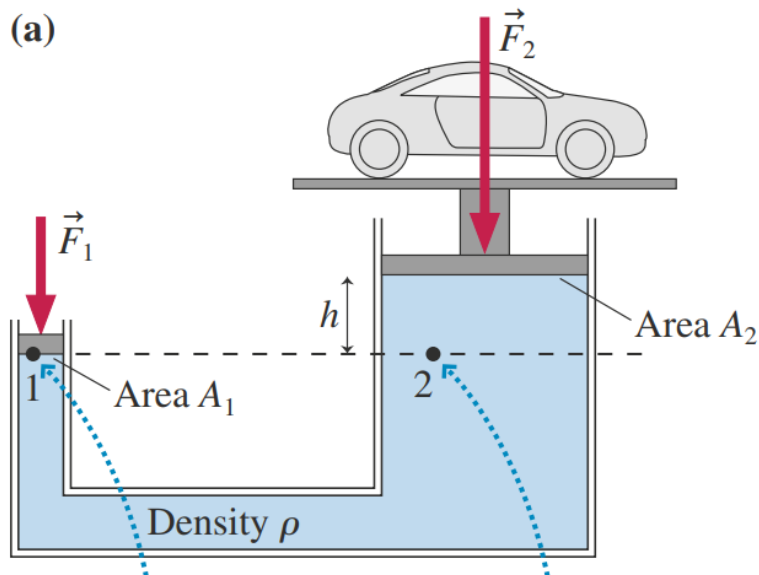
Discussion Problem 3

Hydraulic Jack

You are working on your own car, which weighs 1800 kg. You want to rotate the tires, for which you need to lift the car off the ground.

Suppose you use a Hydraulic jack with the large cylinder radius = 15cm and a small cylinder radius = 6cm.

Assume: The working fluid is water and h (in diagram) is 0



- What is the minimum force needed (in kg-f) on the smaller cylinder in order to lift the car?
- Suppose you want to move the car up by 50cm, how much distance should the small piston be moved down?

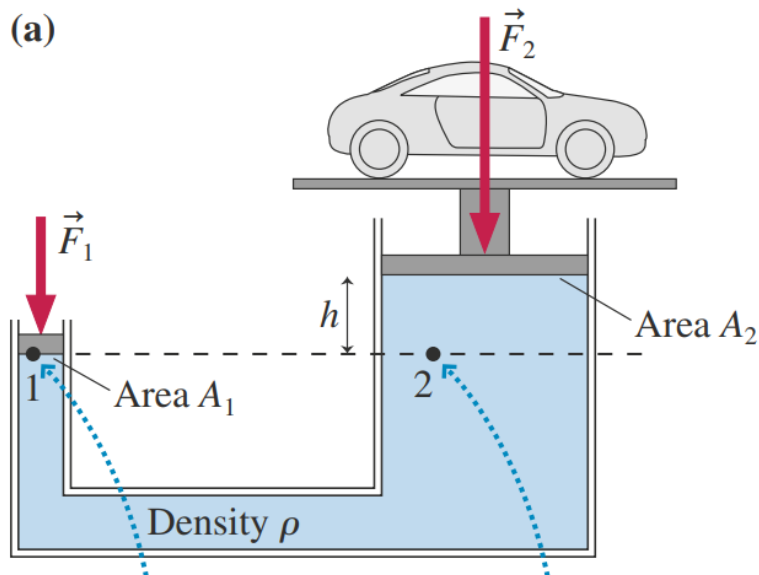
Discussion Problem 3 - Solution

Hydraulic Jack

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- a) What is the minimum force needed (in kg-f) on the smaller cylinder in order to lift the car?
288 kg-f
- b) Suppose you want to move the car up by 50cm, how much distance should the small piston be moved down?
3.125m (or 312.5 cm)