

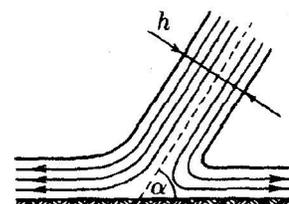
The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:
http://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2022
 The practical information about the club and contacts can be found on the same web page.

TODAY'S MEETING

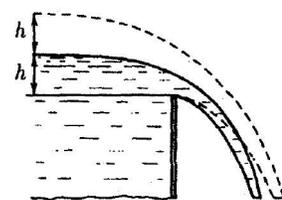
Today we discussed several problems from the assignment on Bernoulli law and Torricelli's equation. The few remaining problems are reassigned. The next topic is ideal gas laws.

REASSIGNED HOMEWORK

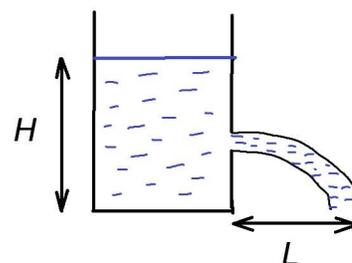
1. A wide flow of water of thickness h encounters a plane at angle α to its direction of flow. What are the thicknesses of flows on which it decomposes?



- *2. Imagine a wide dam with water level being d above the edge. How many times would the water discharge (the volume of water flowing through the dam in the unit of time) grow if the water level was $2d$ above the edge?



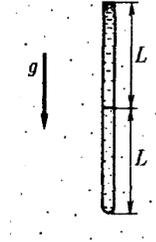
- *3. A tank is filled with water up to height H . We want to drill a hole in a side wall of the tank in such a way that the jet of water produced will land the farthest from the tank. Where should we drill the hole? Tank sits on a horizontal plane.



NEW HOMEWORK

1. How many strokes of a piston pump with working volume V are needed to increase pressure in a vessel of volume V_0 from the atmospheric one P_0 to a higher pressure P ? Temperature in the vessel is constant.
2. A balloon with capacity 50 liters is filled with air at temperature 27°C and pressure 10 MPa. What is the volume of water that could be displaced from a tank of a submarine at depth 40 m with this air? Temperature of air after expansion is 3°C .
3. Atmosphere of Venus consists almost exclusively of carbon dioxide. Its' temperature near the planet surface is about 500°C and pressure is about 100 atm (10^7 Pa). What should be the volume of a space probe of mass 1000 kg for it to float in the bottom layer of Venus atmosphere?
4. Estimate the number of molecules in the Earth's atmosphere.

- *5. The bottom end of a vertical narrow tube of length $2L$ is sealed and the upper end is open into the atmosphere. The lower half of the tube contains gas at temperature T_0 while the upper half is filled with mercury. Gas is slowly heated. At what temperature gas is going to displace all mercury? Atmospheric pressure in the units of mercury column is L .



FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 3:30pm, via Zoom, on Sunday, **March 26**.