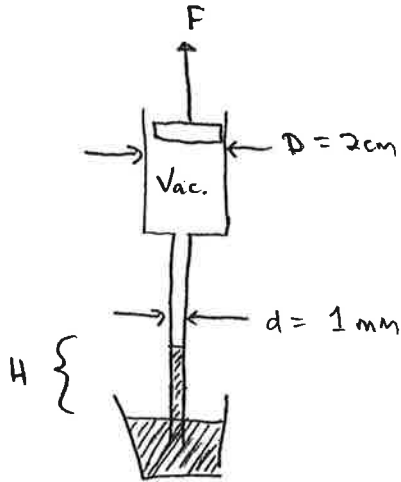


EX 17.1Syringe problem

At sea level, the pressure on the surface of the alcohol is 14 psi, or 760 mm Hg, or 1 atm, or 1.01×10^5 Pa.

Since mercury can be drawn up 760 mm, and specific gravity of Hg and alcohol are 13.6 and 0.79, respectively, the height to which alcohol can be drawn is

$$\frac{H}{760\text{mm}} = \frac{13.6}{0.79} \Rightarrow H = \boxed{13.1 \text{ meters}} \text{ or } \boxed{43 \text{ feet}}$$

The force required is obtained from the area of

the plunger: $[(0.01\text{m})^2 \pi][1.01 \times 10^5 \text{ Pa}] \approx \boxed{32 \text{ Newtons}} \text{ or } \boxed{7.2 \text{ lbs}}$

Atop mount Everest, the atmospheric pressure is $\frac{1}{3}$ that at sea level. So then

$$H = \boxed{4.1 \text{ meters or } 14 \text{ feet}}$$

and $F = \boxed{10 \text{ Newtons or } 2.4 \text{ lbs}}$