Atmospheric Problems Solution 04/26/2021

1) When a rubber sucker is pressed agnist a surface, the air is squzzed out. The atmospheric pressure acts on the outside of the sucker stablizes the object against its smooth surface

2) Assume the mass of a person is 50 kg

$F_{up} = W = P_{atm} \cdot A \Rightarrow A = \frac{F_p}{P_{atm}} = \frac{W}{P_{atm}} = \frac{(50)(10)}{100{,}000} = 0.005\ m^2$

3) For the window: Falls and reaches terminal velocity as the drag force increases

For the passenger: flys out since the pressure inside the airplane is largen than the atmospheric pressure (This is because atmospheric pressure decreases as the altitude increases)

4) $\rho_{H_2O} g h_{H_2O} = \rho_{Hg} g h_{Hg} \Rightarrow \rho_{H_2O} h_{H_2O} = \rho_{Hg} h_{Hg}$

$\rho_{H_2O} < \rho_{Hg}$

$\therefore h_{H_2O} > h_{Hg}$

5) $\rho_{H_2O} g h = P_{atm}$

$h = \frac{P_{atm}}{\rho_{H_2O} g} = \frac{10^5}{(10^3)(10)} = 10\ m$

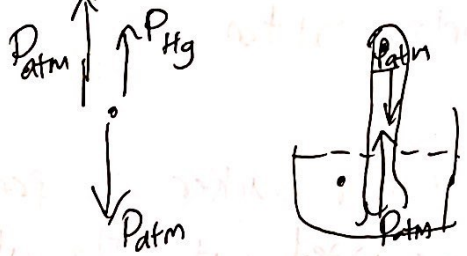
6) Space → Vacume → no pressure

The astronut will have no control in himself/herself.

Because there is no pressure (little pressure), the astronut's blood and body fluid will freeze, and organs will sweel body

Scanned with CamScanner

7)



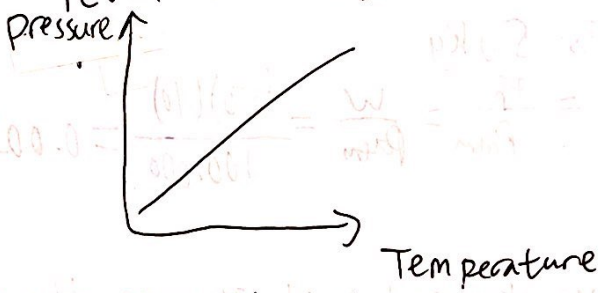
(a) level decreases

(b) level increases

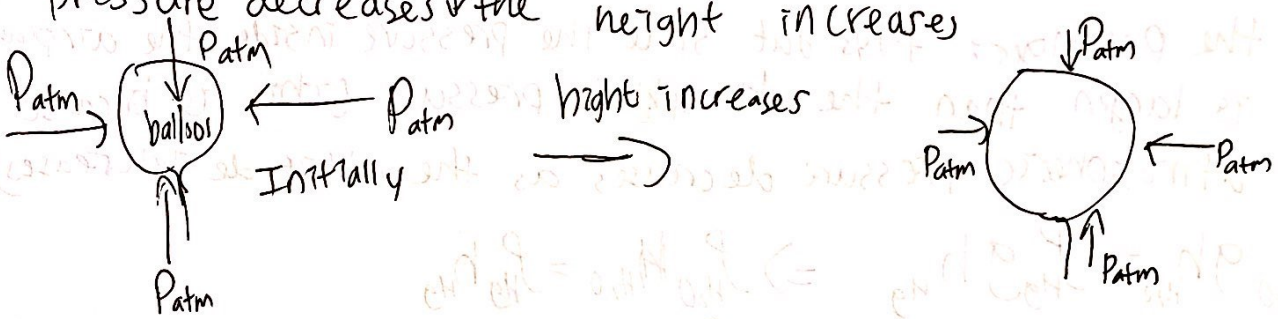
(c) level decreases

(d) level decreases because atmospheric pressure decreases as altitude increases

(e) level increases



8) The gas inside the balloon expands because atmospheric pressure decreases as the height increases



9)

You can do it by yourself

10)

(a)

$$P_{atm} = \rho_{Hg} gh = (13550)(0.95)(9.81) = 126279.225 \text{ Pa}$$

(b) $$P_{atm} = \rho_{Hg} gh = (13550)(0.85)(9.81) = 112986.675 \text{ Pa}$$

Scanned with CamScanner