Expansion of gases

① Boyle's law

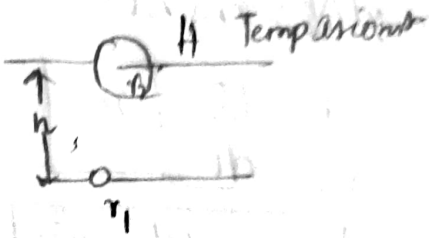
$P \propto 1/V \Rightarrow PV = \text{const}$

② Motion of air bubble :

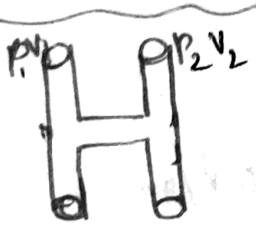
$P_1V_1 = P_2V_2$

$(H+h)V_1 = HV_2$

$(H+h)\frac{4}{3}\pi r_1^3 = (H)\frac{4}{3}\pi r_2^2$



③ Common pressure :



$$P = \frac{P_1V_1 + P_2V_2}{V_1 + V_2}$$

④ Charles law

i) $V \propto T$

$$\boxed{\frac{V_1}{V_2} = \frac{T_1}{T_2}}$$

ii) $P \propto T$

$$\boxed{\frac{P_1}{P_2} = \frac{T_1}{T_2}}$$