Expansion of liquids

① Apparent expansion : $\gamma_a = \frac{\Delta V}{V_1 \Delta t}$, Real expansion $\gamma_R = \frac{V_2' - V_1'}{V_1' \Delta t}$

② Relation blw γ_a & γ_R $\quad \gamma_g$ = volume of vessel raised

$$\gamma_R = \gamma_a + \gamma_g \Rightarrow \gamma_a = \gamma_R - \gamma_g$$

$\gamma_R > \gamma_g$	$\gamma_R = \gamma_g$	$\gamma_R < \gamma_g$
γ_a = +ve	$\gamma_a = 0$	γ_a = -ve
level of liq ↑	lastly. constant	level of liq ↓

③ Unoccupied volume of vessel : $V_L \gamma_L = V_g \gamma_g$, $h_L \gamma_L = h_g \gamma_g$

④ height of mercury raise in thermometer at Δt

$$h = \frac{\Delta V}{A_f} = \frac{V[\gamma_R - 3\alpha_g]\Delta t}{A_i(1+\beta\Delta t)}$$

Specific gravity bottle

⑤ $w_1 \rightarrow$ weight of empty specific gravity bottle

$w_2 \rightarrow$ weight of specific gravity bottle with liq. at t_1

$w_3 \rightarrow$ weight of bottle with some liq. at t_2

$$\gamma_a = \frac{w_2 - w_1}{(w_3 - w_1)(t_2 - t_1)}$$

⑥ Correction of barometer reading:

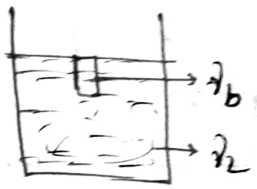
$$H_0 = H_R(1 + (\gamma_{Hg} - \alpha_s)\Delta t)$$

H_0 = Reading at 0°C (true value)

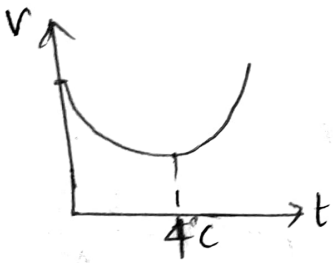
H_R = Reading at t°C

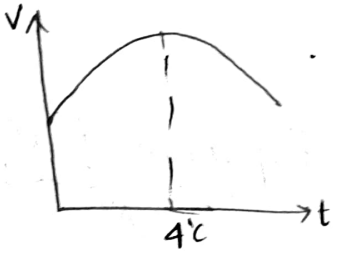
⑦ Buyonacy:

$$\frac{t_2}{t_1} = \frac{1+\gamma_b \Delta t}{1+\gamma_b \Delta t}$$



⑧ Anamolus behaviour of water:





$$\gamma_R = \frac{h_2 - h_1}{h_1 t_2 - h_2 t_1}$$