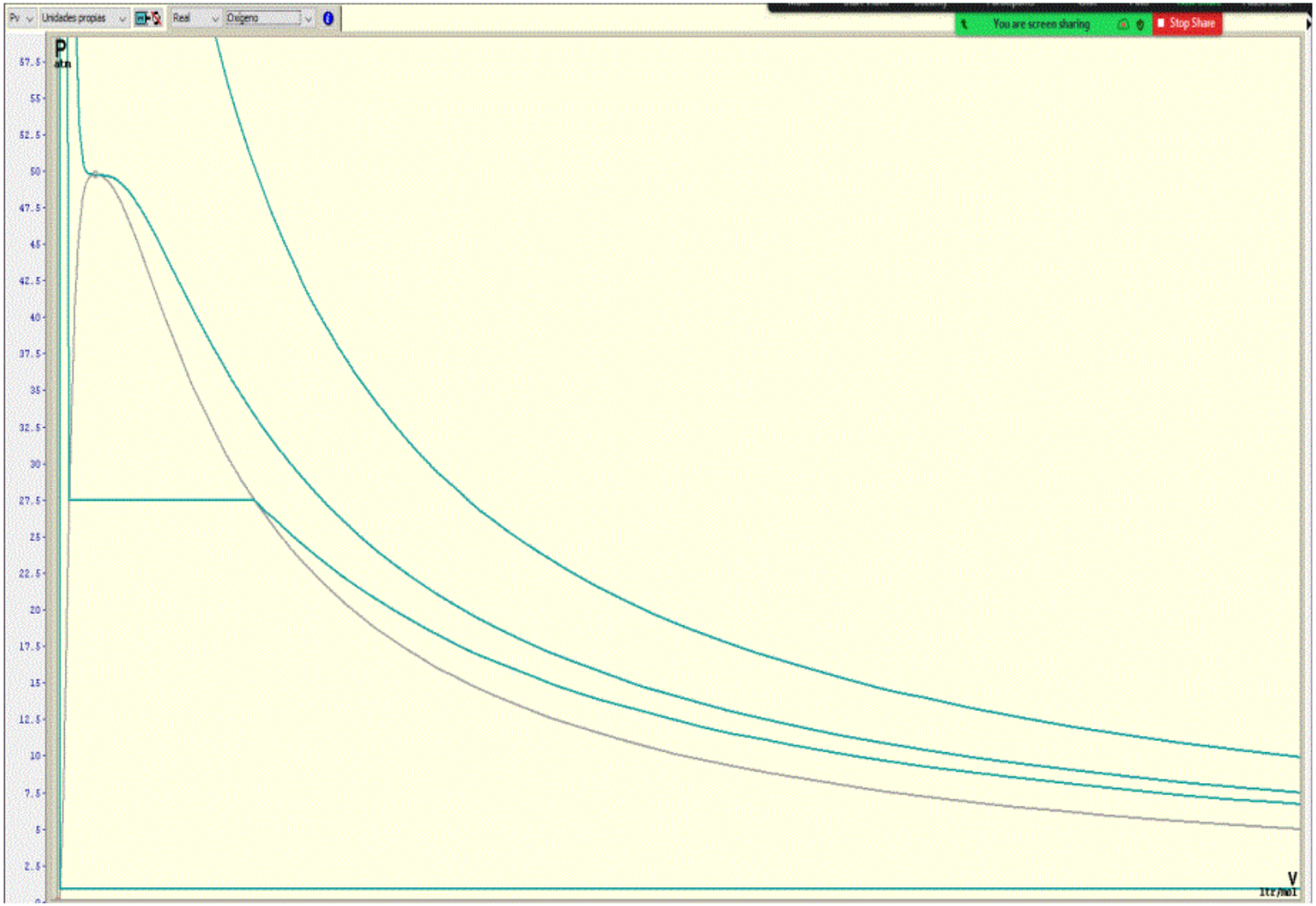
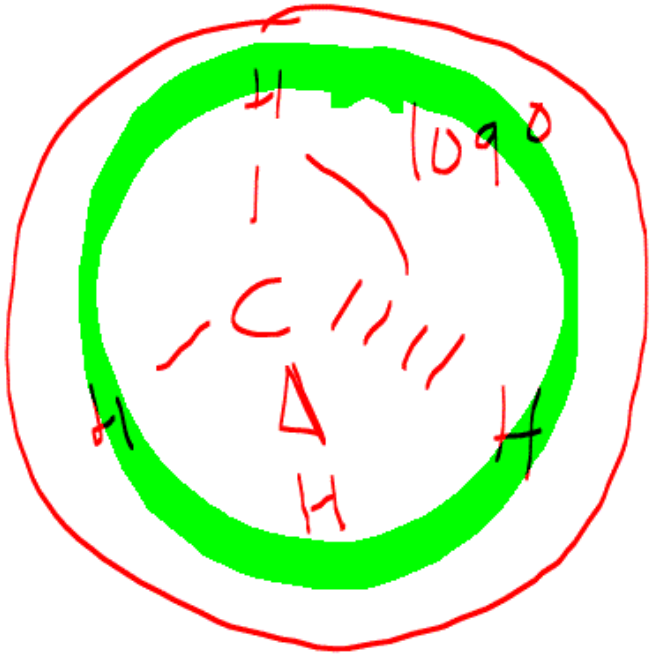
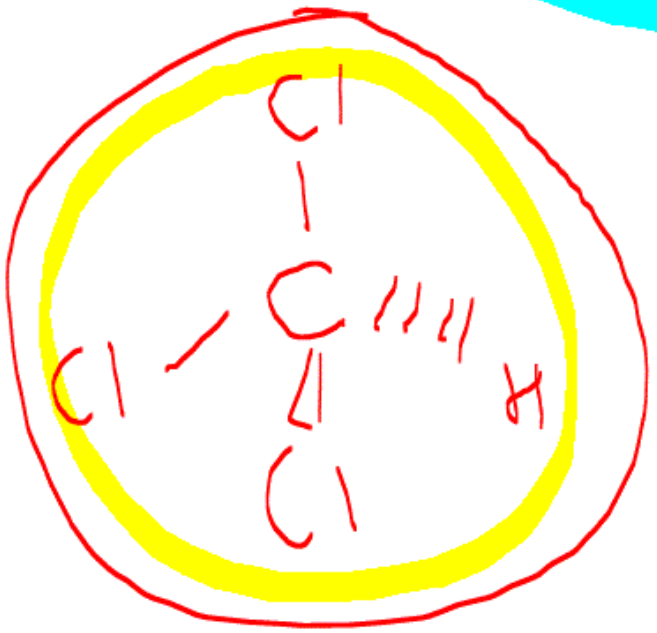
# Clase 57 17 Noviembre 2021

Título de la nota 17/11/2021

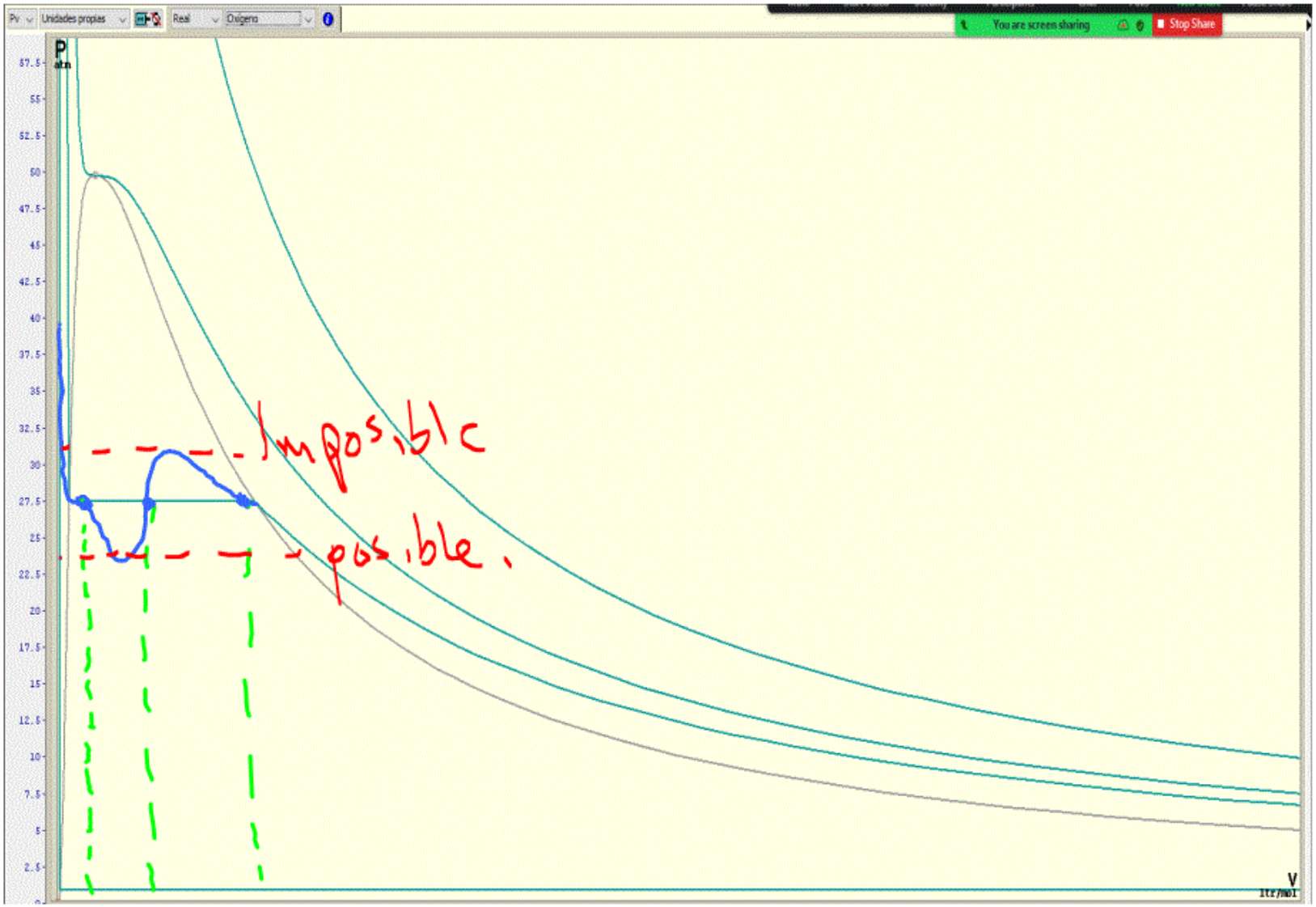



Tetrahedro




cloroformo


Pv
Unidades propias
Real
Oxigeno
You are screen sharing
Stop Share
P
atm
V
ltr/mol
Imposible
posible.

$$p = \frac{nRT}{V - nb} - \frac{an^2}{V^2}$$

$$p = \frac{RT}{\bar{V} - b} - \frac{a}{\bar{V}^2}$$

$$p + \frac{a}{\bar{V}^2} = \frac{RT}{\bar{V} - b}$$

$$\frac{p\bar{V}^2 + a}{\bar{V}^2} = \frac{RT}{\bar{V} - b}$$

$$\left(p\bar{V}^2 + a\right)\left(\bar{V} - b\right) = \bar{V}^2 RT$$

$$\left(p\bar{v}^2 + a\right)\left(\bar{v} - b\right) = \bar{v}^2 RT$$

$$p\bar{v}^3 + a\bar{v} - ab - bp\bar{v}^2 = \bar{v}^2 RT$$

$$p\bar{v}^3 + a\bar{v} - ab - bp\bar{v}^2 - \bar{v}^2 RT = 0$$

$$\frac{p\bar{v}^3 - \bar{v}^2(bp + RT) + \bar{v}a - ab = 0}{p}$$

$$\frac{p\bar{V}^3 - \bar{V}^2(bp + RT) + \bar{V}a - ab = 0}{p}$$

$$\bar{V}^3 - \bar{V}^2\left(b + \frac{RT}{p}\right) + \frac{\bar{V}a}{p} - \frac{ab}{p} = 0$$

$$\left(\frac{L}{mol}\right)^3 - \left\{\left(\frac{L}{mol}\right)^2\left[\left(\frac{L}{mol}\right) + \frac{(atm\,L/(mol\,K))(K)}{atm}\right]\right\}$$

$$\frac{L^3}{mol^3} - \frac{L^3}{mol^3} + \left(\frac{L}{mol}\,\frac{atm\,L^2/mol^2}{atm}\right) - \frac{atm\,L^2/mol^2\,\frac{L}{mol}}{atm}$$

$$\frac{L^3}{mol^3} - \frac{L^3}{mol^3} + \frac{L^3}{mol^3} - \frac{L^3}{mol^3} = 0$$

$$p = \frac{nRT}{V - nb} - \frac{an^2}{V^2}$$

$$\left(p + \frac{an^2}{V^2}\right)\left(V - nb\right) = nRT$$

$$\frac{pV^2 + an^2}{V^2} = \frac{nRT}{V - nb}$$

$$\left(pV^2 + an^2\right)\left(V - nb\right) = V^2 nRT$$

$$\left(pv^2 + an^2\right)\left(v - nb\right) = v^2 nRT$$

$$pv^3 + an^2 v - an^3 b - pnv^2 b = v^2 nRT$$

$$pv^3 + an^2 v - an^3 b - pnv^2 b - v^2 nRT = 0$$

$$\frac{pv^3 - v^2(pnb + nRT) + vn^2 a - an^3 b = 0}{p}$$

$$v^3 - v^2\left(nb + \frac{nRT}{p}\right) + \frac{vn^2 a}{p} - \frac{an^3 b}{p} = 0$$

$$V^3 - V^2\left(nb + \frac{nRT}{p}\right) + \frac{Vn^2a}{p} - \frac{an^3b}{p} = 0$$

$$\frac{\frac{-an^3b}{p} + \frac{Vn^3a}{p} - V^2\left(nb + \frac{nRT}{p}\right) + V^3 = 0}{V^2}$$

$$-\frac{an^3b}{pV^2} + \frac{an^2}{pV} - \left(nb + \frac{nRT}{p}\right) + V = 0$$

$$\left(-\frac{an^3b}{pv^2}+\frac{an^2}{pv}-\left(nb+\frac{nRT}{p}\right)+v=0\right)p$$

$$-\frac{an^3b}{v^2}+\frac{an^2}{v}-pnb-nRT+pV=0$$

$$-\frac{an^3b}{v^2}+\frac{an^2}{v}-n(pb+RT)+pV=0$$

$$n=\frac{m}{M}$$

$$-\frac{an^3b}{V^2}+\frac{an^2}{V}-n(pb+RT)+pV=0$$

$$-\frac{a\left(\frac{m}{M}\right)^3b}{V^2}+\frac{a\left(\frac{m}{M}\right)^2}{V}-\frac{m}{M}\left(pb+RT\right)+pV=0$$

$$\left\{-\frac{am^3b}{M^3V^2}+\frac{am^2}{M^2V}-\frac{m}{M}\left(pb+RT\right)+pV=0\right\}M^3$$

$$-\frac{am^3b}{V^2}+\frac{am^2M}{V}-mM^2\left(pb+RT\right)+pVM^3=0$$

$$-\frac{a m^3 b}{V^2} + \frac{a m^2 M}{V} - m M^2 (pb + RT) + pVM^3 = 0$$

$$pVM^3 - M^2 m (pb + RT) + \frac{M a m^2}{V} - \frac{a m^3 b}{V^2} = 0$$

Masa molar real | Mezclado | Masa molar real Ind Vc | Masa molar real Dep Vc

## Obtención de ecuación cúbica de la masa molar (M) tipo Van der Waals

Introducir los valores en las celdas de color amarillo

| | |
|---|---|
| T (K) | 298.15 |
| m (g) | 40.0000 |
| p (atm) | 1.0000 |
| a ($atmL^2/mol^2$) | 3.5920 |
| b (L/mol) | 0.04267 |
| R (atmL/molK) | 0.0820 |
| V (L) | 20.2000 |

$$pVM^3 - \hat{m}m(pb+RT) + M\frac{am^2}{V} - \frac{am^3b}{V^2} = 0$$


| $M^3$ | $M^2$ | M | Cte |
|---|---|---|---|
| 20.20000 | -979.63880 | 284.51485 | -24.04010 |

$$pVM^3 - mM^2(RT+pb) + M\left(\frac{am^2}{V}\right) - \frac{abm^3}{V^2} = 0$$

| | |
|---|---|
| M ideal (g/mol) | 48.4125 |

## Resolución de M cúbico tipo $AM^3+BM^2+CM+D=0$

| | | |
|---|---|---|
| A= | 20.200000 | |
| B= | -979.638800 | |
| C= | 284.514851 | |
| D= | -24.040096 | |
| Expresión | 2 | decimales |