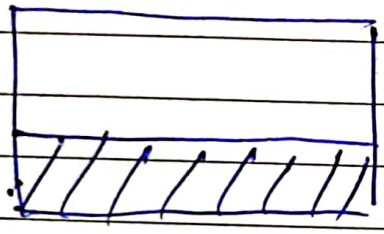
October - 2021
M T W T F S S M T W T F S S
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31

Application of Thermodynamics.

$$C_p = T\left(\frac{\partial S}{\partial T}\right)_p \qquad C_v = T\left(\frac{\partial S}{\partial T}\right)_V$$

ΔQ_r = Latent heat $L = T\Delta S = T_c(S_2 - S_1)$

$$dG = V\,dp - S\,dT + \sum \mu_i\, dN_i$$

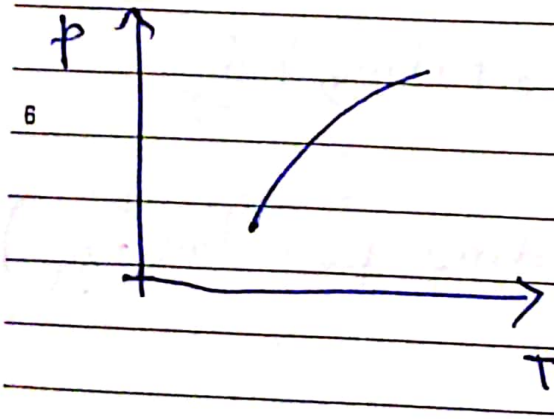


$$G_T = \mu_1 N_1 + \mu_2 N_2$$

$$\Rightarrow dG_T = 0 = \mu_1 dN_1 + \mu_2 dN_2$$

$$\Rightarrow dN_1 = -dN_2$$

$$\mu_1 = \mu_2.$$



2021

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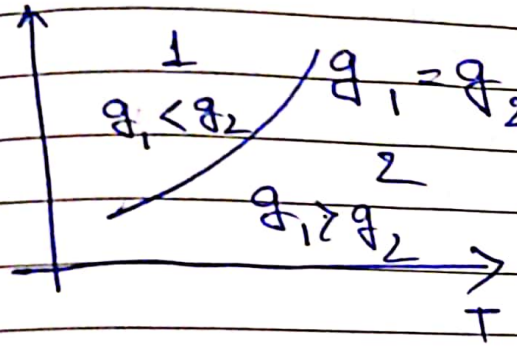
Application of Thermodynamics.

$C_p = T\left(\frac{\partial S}{\partial T}\right)_p$; $C_v = T\left(\frac{\partial S}{\partial T}\right)_v$

Latent heat (L) $= \Delta Q_r = TdS = T_c(S_2 - S_1)$



$$G_1 = m_l q_l + m_v q_v$$
$$= (m_l - dm_l) q_l + (m_v + dm_v) q_v$$
$$= G_2$$

$$G_2 = (m_l - dm_l) q_l + (m_v + dm_v) q_v$$
$$= (m_l q_l + m_v q_v) + (dm_v q_v - dm_l q_l)$$
$$= G_1 + dG$$

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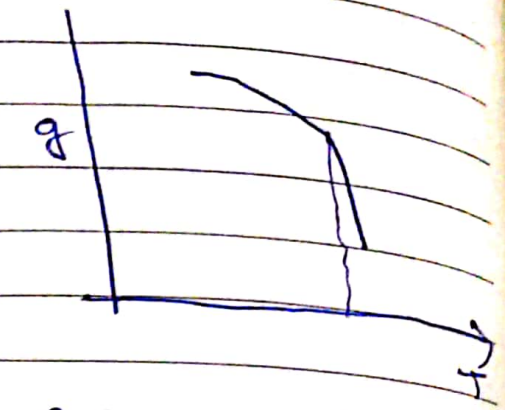
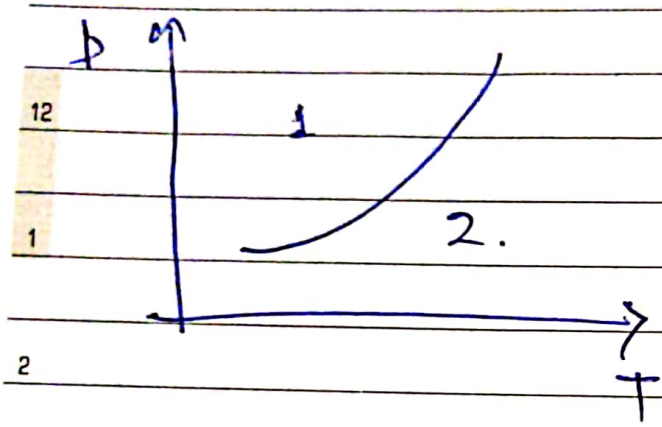
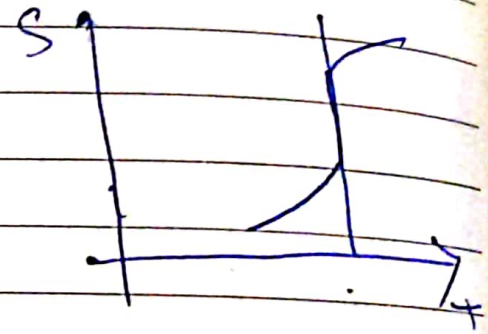
$$dG = g_l\, dm_l - g_v\, dm_v = 0$$

$$\Rightarrow \quad dm_l = dm_v$$

$$g_l = g_v$$







$$g_1 = g_2 \qquad g = g(p,T)$$

$$\Rightarrow dg_1 = dg_2$$

$$\Rightarrow \left(\frac{\partial g_1}{\partial p}\right)_T dp + \left(\frac{\partial g_1}{\partial T}\right)_p dT = \left(\frac{\partial g_2}{\partial p}\right)_T dp + \left(\frac{\partial g_2}{\partial T}\right)_p dT$$

$$\Rightarrow v_1\, dp - s_1\, dT = v_2\, dp - s_2\, dT$$

$$\Rightarrow (v_1 - v_2)\, dp = (s_1 - s_2)\, dT$$

$$\Rightarrow \frac{dp}{dT} = \frac{s_1 - s_2}{v_1 - v_2} = \frac{\Delta s}{\Delta v} = \frac{L}{T \Delta v}$$

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