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THERMODYNAMICS

(36)

$C_6H_6(l,\ 0.2\text{ atm},\ 80^\circ C) \xrightarrow[\Delta G = ?]{} C_6H_6(g,\ 0.2\text{ atm},\ 80^\circ C)$

$\Delta G_1 = V_l(1 - 0.2)$ (↓)

$\Delta G_3 = nRT\ln\frac{0.2}{1}$ (↑)

$C_6H_6(l,\ 1\text{ atm},\ 80^\circ C) \xrightarrow{\Delta G_2 = 0} C_6H_6(g,\ 1\text{ atm},\ 80^\circ C)$

$\Delta G = \Delta G_1 + \Delta G_2 + \Delta G_3$

ΔG_1 neglected

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$H_2O(s) \xrightarrow{2\,atm,\ 273.15} H_2O(\ell)$

$P\uparrow$ forward

$\Delta G_r < 0$

$\Delta S > 0$

endo $\Delta H > 0$

$Fe(s) \xrightarrow{2\,atm} Fe(\ell)$

$\Delta G > 0$

$P\downarrow$ backward

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(42) $\Delta G_{298} = \Delta H - 298\,\Delta S$

$\Delta G_{310} = \Delta H - 310\,\Delta S$

298 K

$(\Delta G_f)_R = 0$

$(\Delta S_R)_{T_1} = (\Delta S_R)_2$

(43) $\Delta G \times 0.01$

$= -6000 - \dfrac{300 \times 18}{18}$

$= -6054\ kJ$

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$-dG = W_{non\text{-}PV,\ by}$

$P = 1\ atm$, $T = 400\ K$

$\Delta S_r = -50\ J/K/mol$

$Q = -100\ kJ$

$\Delta G = -100\ kJ - \frac{400(-50)}{1000}$

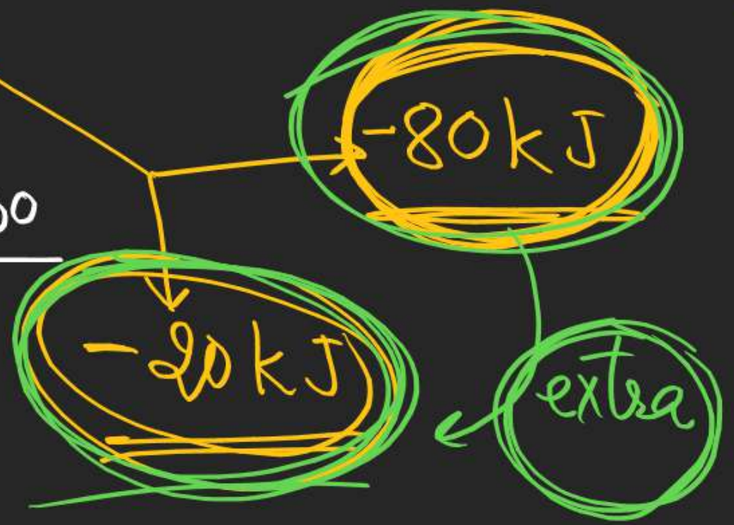
$\Delta G_r = -80\ kJ$

$\Delta S_{surr} = 50 = \frac{q_{surr}}{400}$

$q_{surr} = 20\ kJ$

$\Delta S_{surr} = \frac{-Q_{sys}}{400} = \frac{100 \times 1000}{400}$

$= 250\ J/mol/K$



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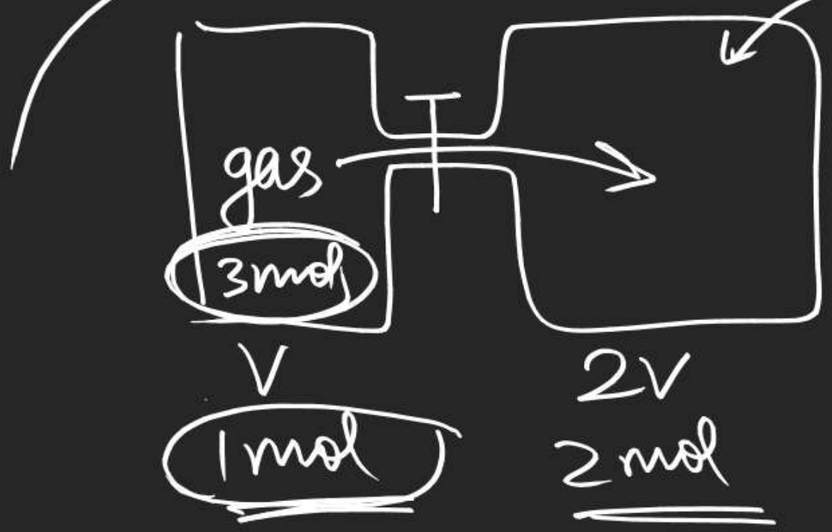
Relationship betⁿ ΔG & K_{eq}

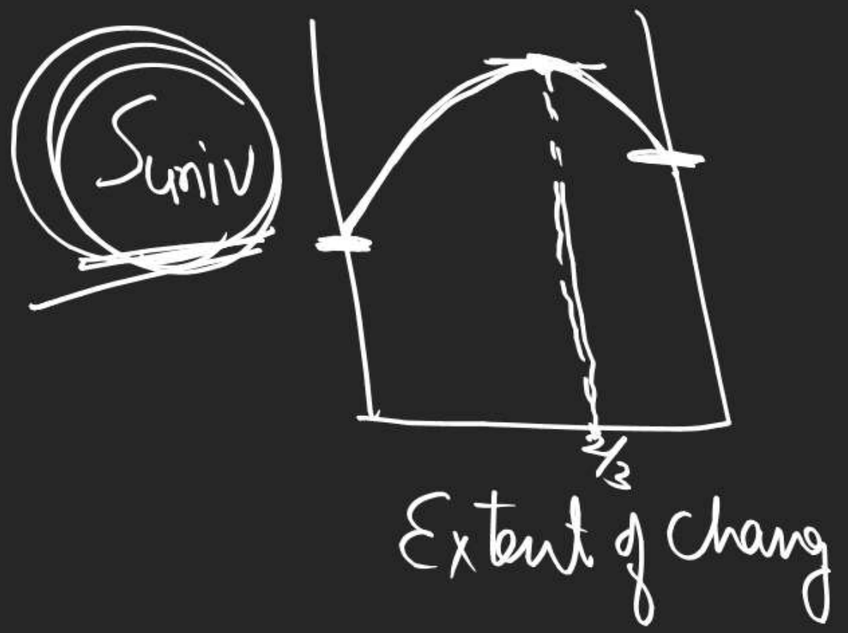
T, P = Const

$A \longrightarrow B$ $\qquad$ $B \longrightarrow A$

$\Delta G = \Delta H - T\Delta S < 0$ $\qquad$ $\Delta G > 0$



At eqlbm entropy of universe is maximum.



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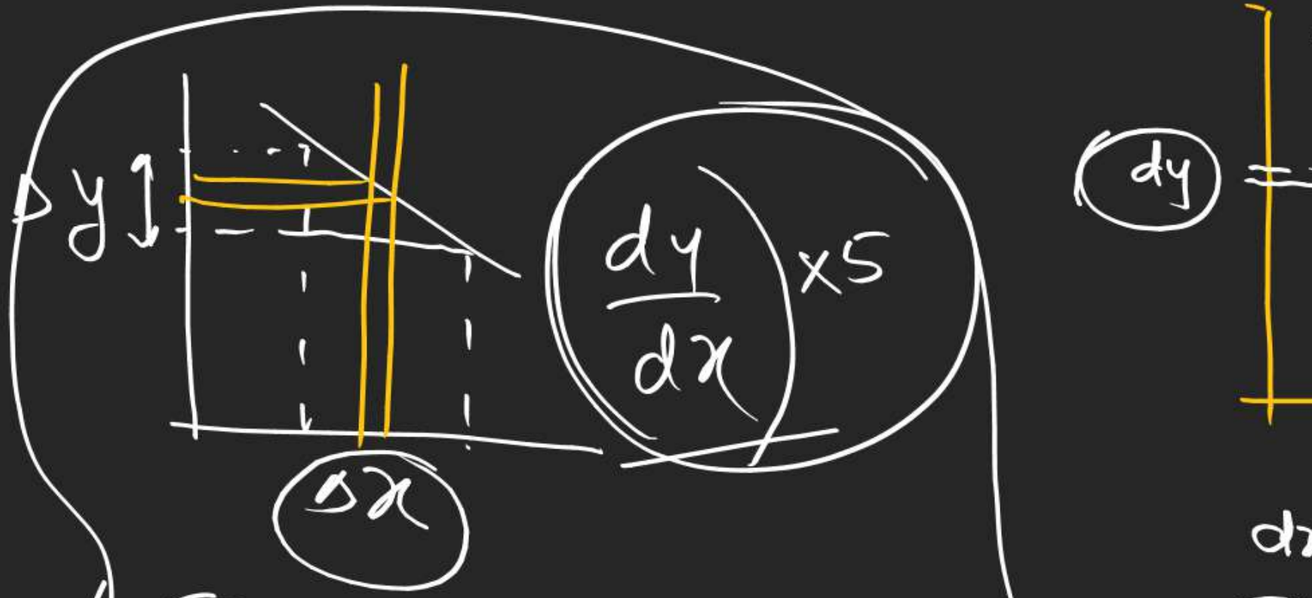
$$\frac{(\Delta Y)}{(\Delta X)}$$

$$\frac{\Delta Y}{\Delta x} = \frac{dy}{dx}$$

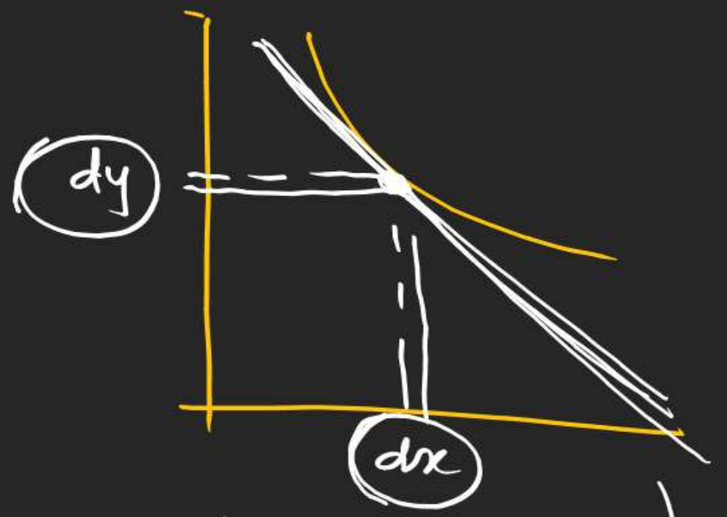
$$\frac{ds}{dt} = 10\ km/hr$$

dt	ds
1	$\frac{ds}{dt}$



Δx	ΔY
1	$\frac{\Delta y}{\Delta x}$

Change in y per unit change in X $= \frac{\Delta y}{\Delta x} = \frac{dy}{dx}$



dx	dy
1	$\frac{dy}{dx}$

×5

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