Nishant Jindal

Q. for the given rxn

$$A(g) + B(g) \longrightarrow C(g) + D(g)$$

the no. of moles at eqlbm was found to be 4, 4, 2 & 8 respectively in 1 lit container. find the no. of moles at new eqlbm if 18 moles of D are added to above container

A	B	C	D	
4	4	2	8	← old eqlbm
4	4	2	26	
$4+x$	$4+x$	$2-x$	$26-x$	
5	5	1	25	← new eqlbm

$$1 = \frac{(2-x)(26-x)}{(4+x)(4+x)}$$

	A	$+$	B	$\longrightarrow$	C	$+$	D
add^n of 'D'	$\uparrow$		$\uparrow$		$\downarrow$		$\uparrow$
add^n of A	$\uparrow$		$\downarrow$		$\uparrow$		$\uparrow$
add^n of C	$\uparrow$		$\uparrow$		$\uparrow$		$\downarrow$
Removal of B	$\uparrow$		$\downarrow$		$\downarrow$		$\downarrow$

11 Effect of change in pressure

akk7007

0 - I   Upto 62

S - II   1 - 4

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$$A_2 + 2B_2 \rightarrow 2C_2$$

$$0.8 \qquad 0.4 \qquad 1.6$$

$$\frac{\cancel{1.6}^{4} \times \cancel{1.6}\,4}{0.8 \times \cancel{0.4}^{1} \times \cancel{0.4}^{1}}$$

$$= \frac{160}{8} = 20$$

2.8

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$$A + 2B \rightarrow 2C + D$$

$$a \qquad 1.5a$$

$$a - x \qquad 1.5a - 2x \qquad 2x \qquad x$$

$$a - x = x$$

$$x = a/2$$

$$1.5a - 2\,a/2$$

$$= 0.5a$$

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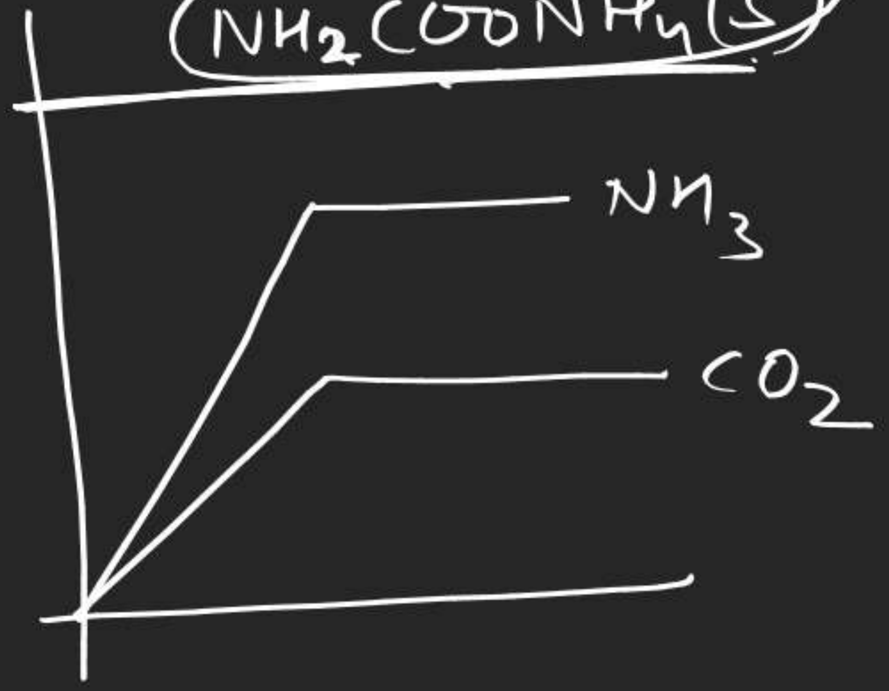
$$NH_4HS(s) \longrightarrow NH_3(g) + H_2S(g) \quad K_p = 3$$

$$2+x \qquad x$$

$$K_p = 3 = (2+x)(x)$$

62

$$NH_2COONH_4(s) \rightarrow 2NH_3 + CO_2$$



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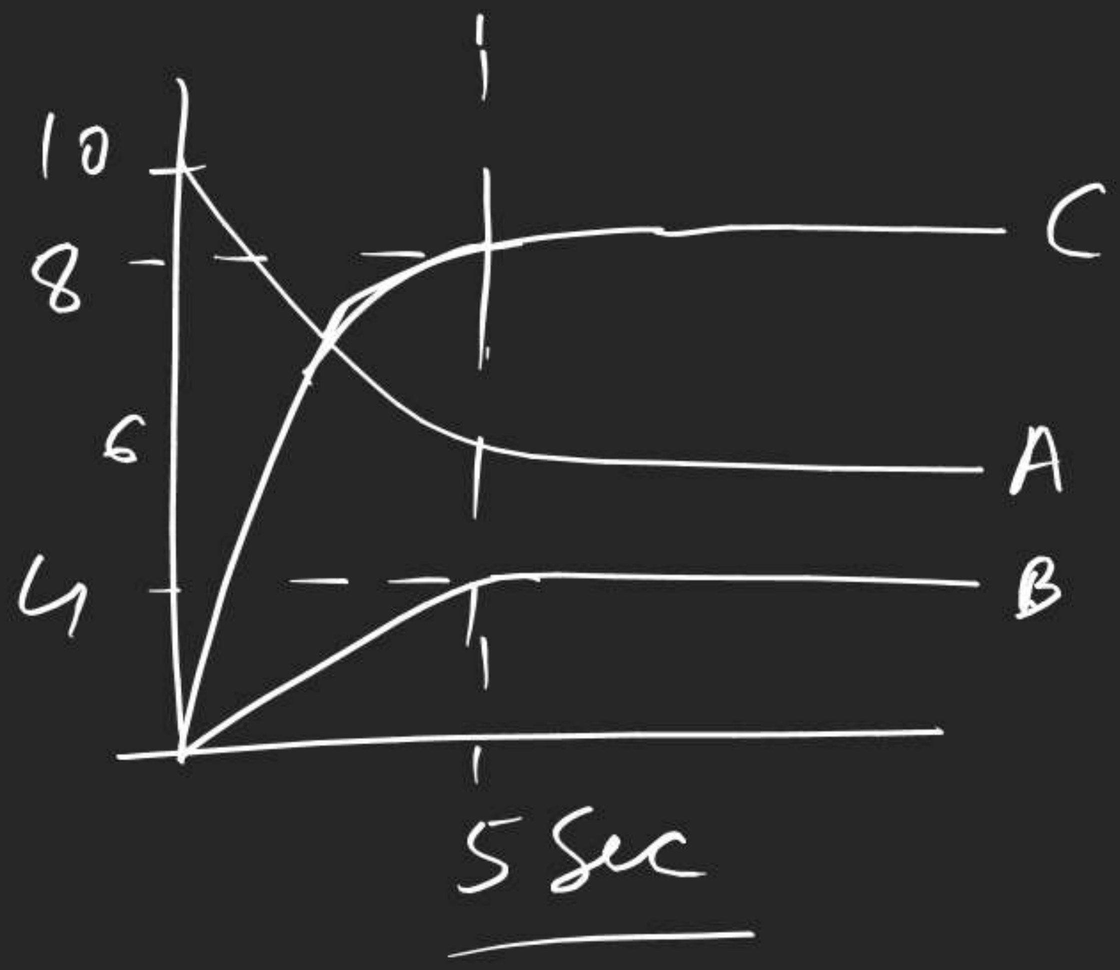

$$A \rightarrow B + 2C$$

$$K_c = \frac{4 \times 64}{6}$$

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$$NH_2COONH_4(s) \longrightarrow 2NH_3(g) + CO_2(g)$$

$$2P \qquad P$$

$$3P \qquad P'$$

$$K_p = (2P)^2(P) = 4P^3$$

$$K_p = (3P)^2(P') = 4P^3$$

$$P' = \frac{4P}{9}$$

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(4) $\underline{Ni(s)} + 4CO(g) \rightarrow Ni(CO)_4$ $K_p = 0.125$

x moles x moles

$Q_p > K_p$

let Pressure is P

$$Q_p = \frac{x}{x^4}\left(\frac{P}{2x}\right)^{1-4}$$

$$= \frac{1}{x^3} \times \left(\frac{2x}{P}\right)^3$$

$$= \frac{1}{\cancel{x^3}} \times \frac{8\cancel{x^3}}{P^3} > 0.125$$

$$\cancel{1000}^{8} \times \frac{8}{\cancel{0.125}} > P^3$$

$$64 > P^3$$

$$4 > P$$

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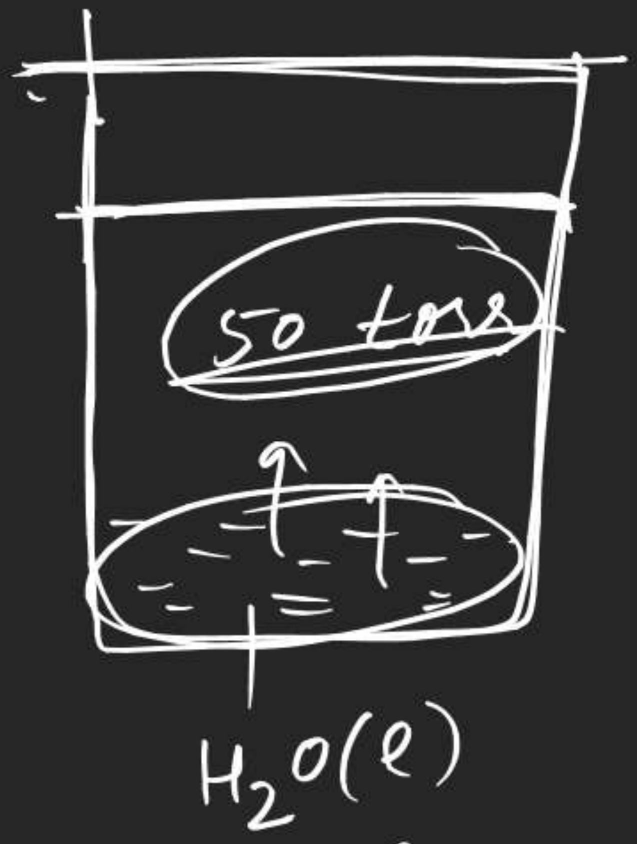
Relative Humidity =

P_{H_2O} > aqueous tension condensation

P_{H_2O} < aqueous tension vapourisation

(RH) Relative humidity = $\dfrac{P_{H_2O}}{\text{aqueous tension}} \times 100$

RH > 100% condensation



at 25°C

v.pr = 50 torr

= aqueous tension

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Effect of change in pressure :→

$$A_{(g)} \rightarrow B_{(g)} + C_{(g)}$$

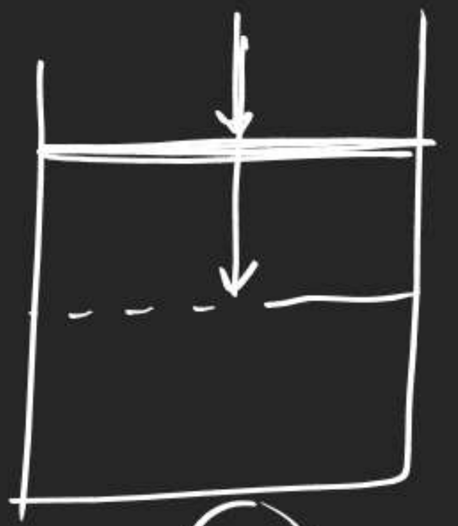
a b c

$$K_c = \frac{b \times c}{a} \times \frac{1}{V}$$

An increase in pressure (by decreasing volume) Rxns favours the direction which produces less no. of moles of gases.

Pressure ↑

Volume ↓



$$P = \frac{nRT}{V}$$

An increase in volume favours the Rxn which produces more no. of moles of gases

$$2HI(g) \rightarrow H_2(g) + I_2(g)$$

$$\Delta n_g = 0$$

P↑ eqlbm will not shift in any dirn

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Q. for the given Rxn

$$A(g) \longrightarrow B(g) + C(g)$$

The no. of moles at eqllb^m was found to be 2, 6 & 4 respectively at 10 atm. find the no. of moles and pressure of each substance if eqllb^m is re-established at 50 atm.

old	2	6	4
	$2+x$	$6-x$	$4-x$
new	4	4	2
new	$\frac{4}{10}\times 50 = 20$	20	10
old	$\frac{2}{12}\times 10 = \frac{10}{6}$	$\frac{6}{12}\times 10 = 5$	$\frac{4}{12}\times 10 = \frac{10}{3}$

$$10 = \frac{(6-x)(4-x)}{(2+x)}\left(\frac{50}{12-x}\right)$$

$$x = 2$$

$$K_p = \frac{P_B P_C}{P_A \uparrow}$$

$$P_A = \frac{n \uparrow RT}{V \downarrow} \qquad P = \frac{nRT}{V \downarrow}$$

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$A \longrightarrow 2B$

$P \uparrow$ backward

$K_p = \dfrac{P_B^2}{P_A} \uparrow$

20	20	10
5/3	5	10/3

$A \longrightarrow B + C$

$P_A \uparrow \quad P_B \uparrow \quad P_C \uparrow$