Nishant Jindal

Ideal Gas

(3)

$$PV = nRT$$

$$PV = \frac{W}{M}RT$$

$$PM = \frac{W}{V}RT$$

$$\boxed{PM = dRT}$$

(4)

P	T	4 gm
P	$T+50$	3.2

$$n_1T_1 = n_2T_2$$

$$\frac{4}{\cancel{M}}T = \frac{3.2}{\cancel{M}} \times (T+50)$$

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Ideal Gas

(6)

200 ml N_2

720 mm

400 ml O_2

750 mm

1000 ml

$$\boxed{P_1 V_1 = P_2 V_2}$$

(7) $2NH_3 \longrightarrow N_2 + 3H_2$

$2NH_3$	N_2	$3H_2$	
a			(a)
0	a/2	3a/2	(2a)

$$\frac{V \times P_i = a\ R\ T}{V \times P_f = 2a\ R\ 2T}$$

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Ideal Gas

(13)

$$\log V = \log \frac{nR}{P} + \log T$$

$$\log \frac{nR}{P} = 1$$

$$\frac{nR}{P} = 10$$

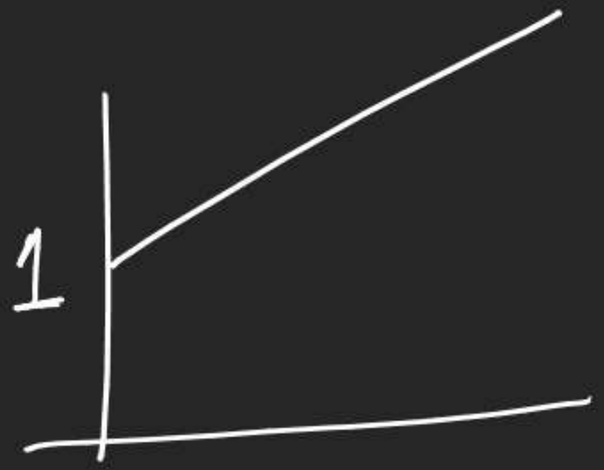
$$\frac{n \times 0.0821}{8.21\ T_{10}} = 10$$

$$n = 100$$

$$\frac{n \times 0.0821}{0.821\ T_{10}} = 10$$

$$n = 100$$

(11) B, C



Ideal Gas

(5) $V_{O_2} =$ 0.2 lit per hour per kg body kg

$V_{O_2} = 0.2 \times 60$ lit per hr

$= 12$ lit

$n_{O_2} = \dfrac{1 \times 12}{R \times 300}$

$\underline{C_6H_{12}O_6} + 6O_2 \longrightarrow 6CO_2 + 6H_2O$

Ideal Gas

7

$2H_2 + O_2 \longrightarrow 2H_2O(g)$ 473 K

10 gm 64 gm

5 mol 2 mol

1 mol 0 4 mol

$P \times 1 = 5 \times R \times 473$

Ideal Gas

(2)

500 gm solution + 1000 gm H_2O

urea $\quad$ H_2O

0.2 mol $\quad$ 0.8 mol

12 gm $\quad$ 14.4 gm

= 26.4 gm

$\boxed{\text{urea}}$ $\quad$ $\boxed{H_2O}$

$\frac{12}{26.4} \times 500$ $\quad$ $\frac{14.4}{26.4} \times 500 + 1000 \text{ gm}$

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Ideal Gas

Ideal Gas

$H_3PO_4 + 3NaOH$

$\boxed{20 \times 2 \times 3 \text{ mmoles of NaOH}}$ in 300 ml

$$[NaOH] = \frac{12\cancel{0}}{3\cancel{0}0} = 0.4\,M$$

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Ideal Gas

875 gm/ml

(5)

$d_{milk} = 1.035$ kg

milk = fat + remaining part (fat free milk)

$d = 1035$ gm/ml

$d = ?$

1 lit milk

100ml

900ml

1035 gm

0.1×875 gm $+ 900 \times d$

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Ideal Gas

(9) P vs $\ln T$

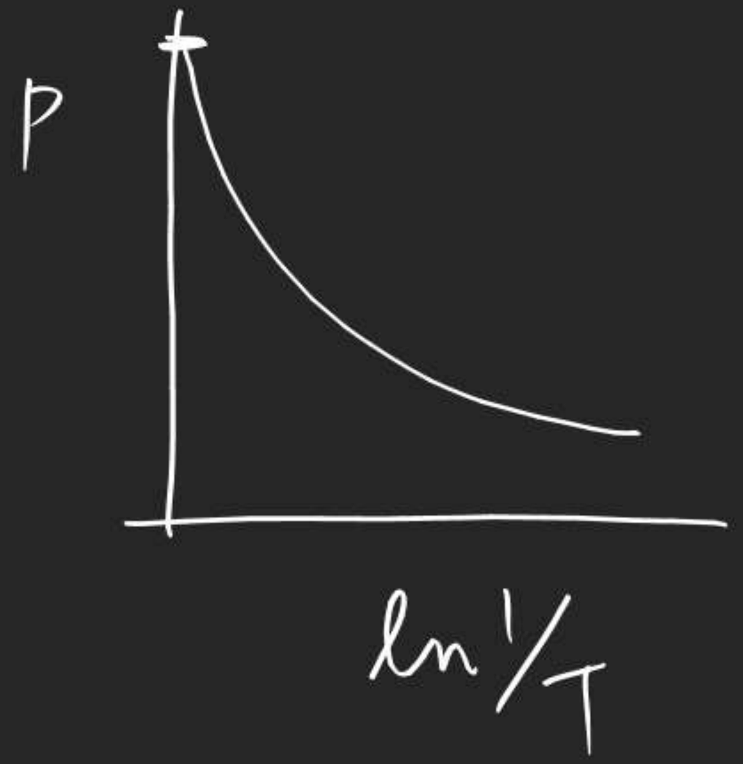
$P = y$ $\qquad$ $\ln T = x$

$T = e^{x}$

$PV = nRT$

$y = \left(\frac{nR}{V}\right) e^{x}$

(10) P vs $\ln 1/T$



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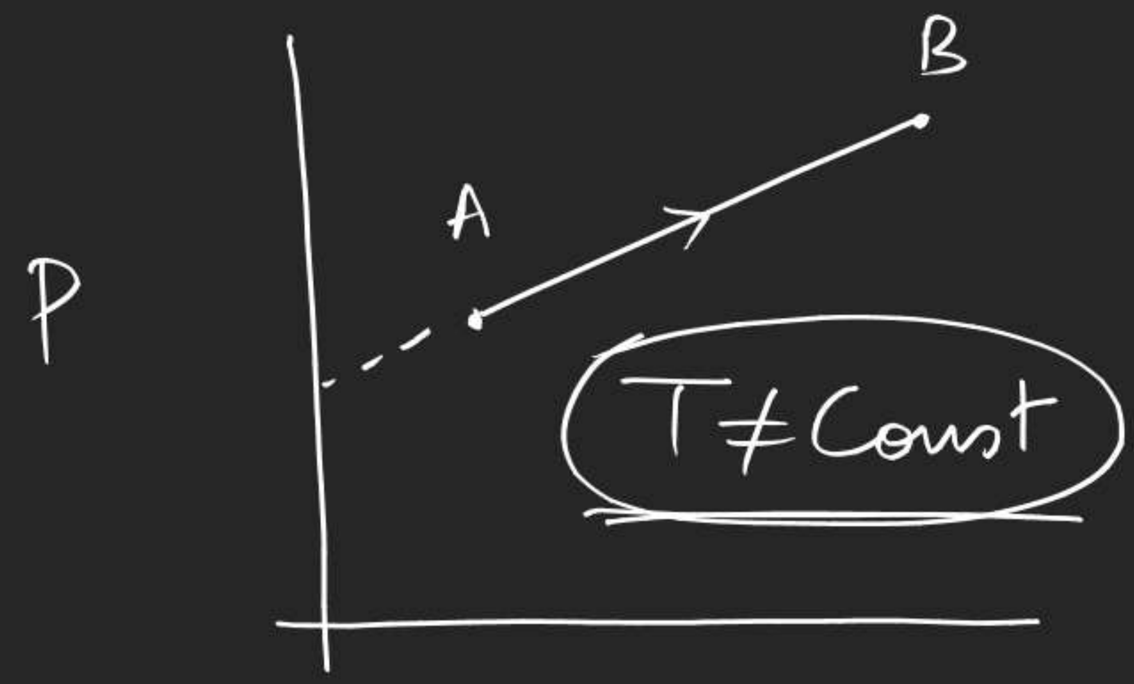


$$\frac{1}{V}$$

$$P = nRT\,\frac{1}{V}$$

$n = \text{Constant}$

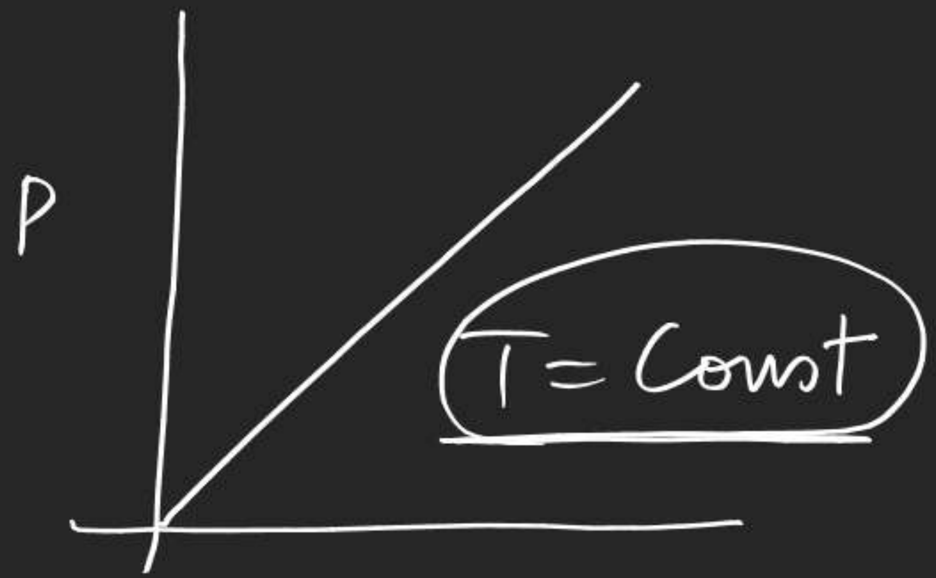
$$P = nRT\,\frac{1}{V}$$

let $T = 2V + 3$

$$P = nR(2V+3)\,\frac{1}{V}$$

$$P = 2nR + 3nR\left(\frac{1}{V}\right)$$

st. line not passing through origin



$$\frac{1}{V}$$

$$P = nRT\left(\frac{1}{V}\right)$$

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$y = mx$

$m = \text{Constant}$

$m = \text{slope}$

Curve will be st. line passing through origin

$m \neq \text{Constant}$ (Now m is not slope)

Slope may be constant

let $m = 3 + 2/x$

$y = (3 + 2/x)x$

$y = 3x + 2$

slope = 3

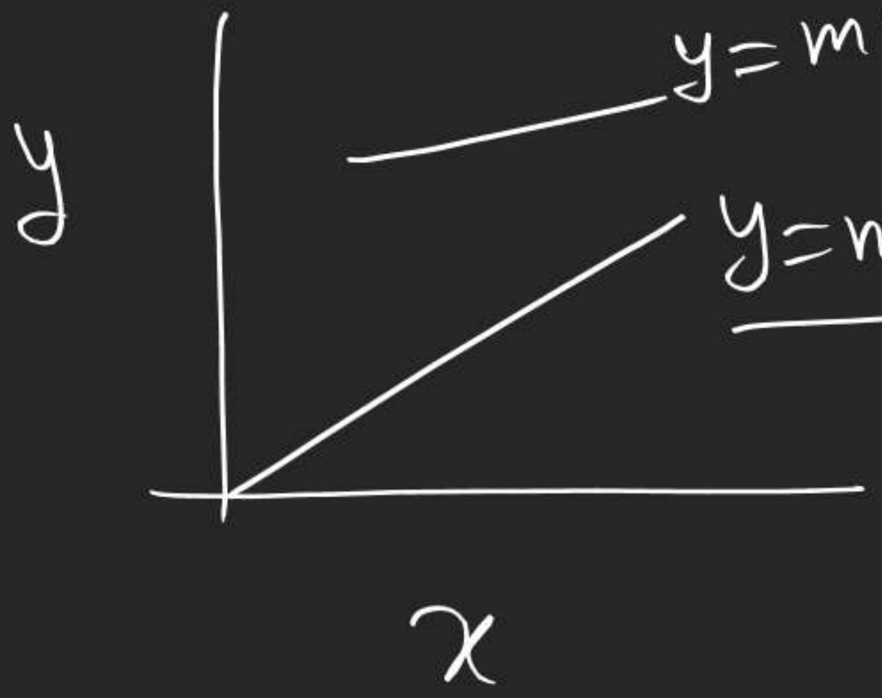
St. line not passing through origin

slope may not be constant

$m = x + 2$

$y = (x+2)x$

$= x^2 + 2x$

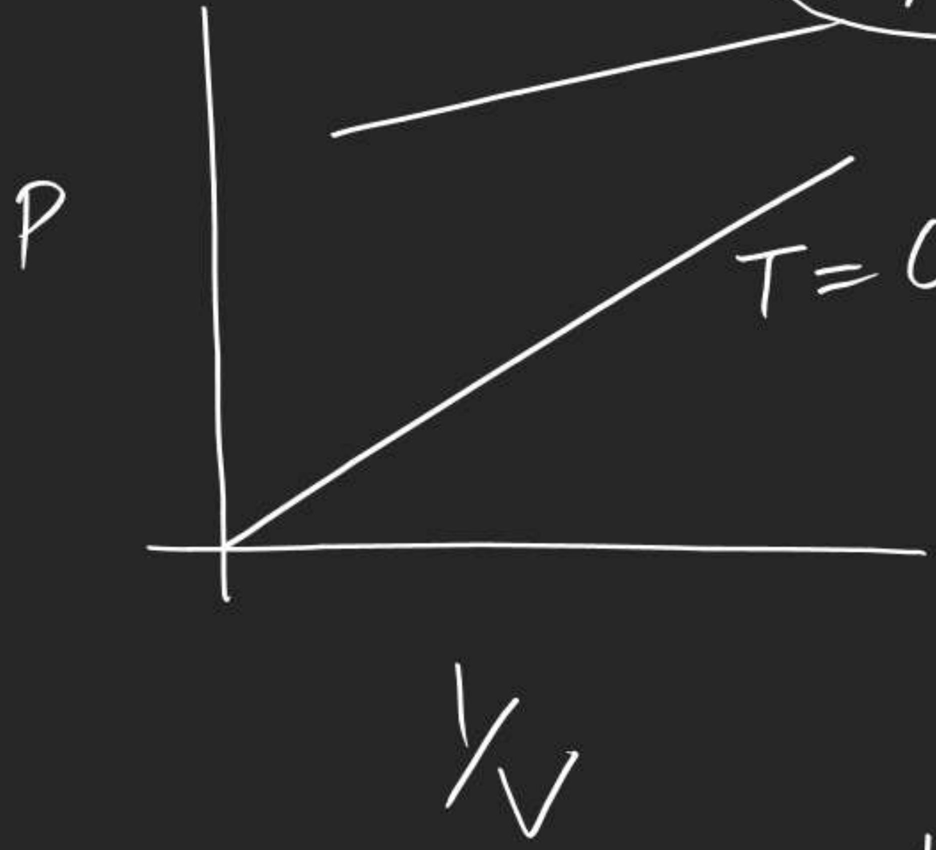


$y = mx \rightarrow m \neq \text{Const}$

$\underline{y = mx} \rightarrow m = \text{Const}$

$n = \text{Const}$

$T \neq \text{Const}$



$T = \text{Const}$

$$P = nRT \frac{1}{V}$$

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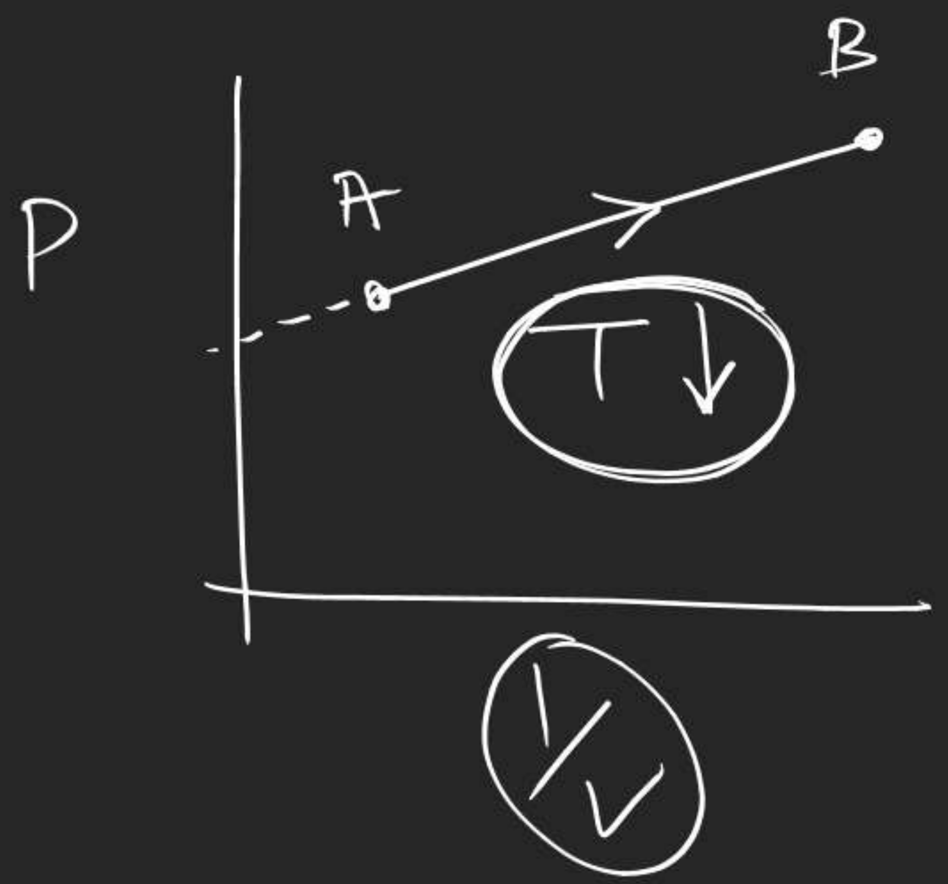
Ideal Gas



$m > 0$

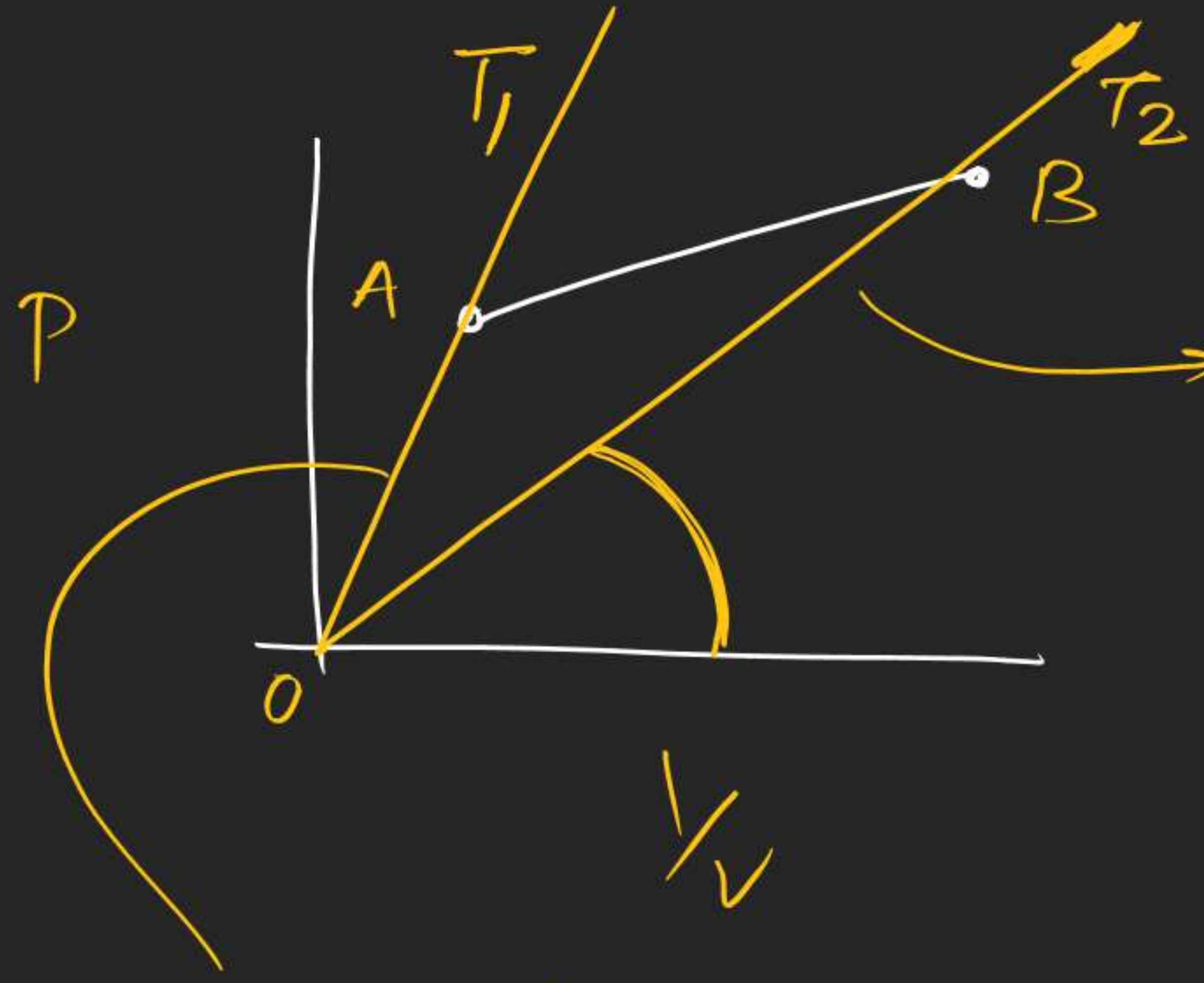
$c > 0$

$$P = m\frac{1}{V} + c$$

$$\frac{nRT}{V} = m\frac{1}{V} + c$$

$$nRT = m + cV \uparrow$$

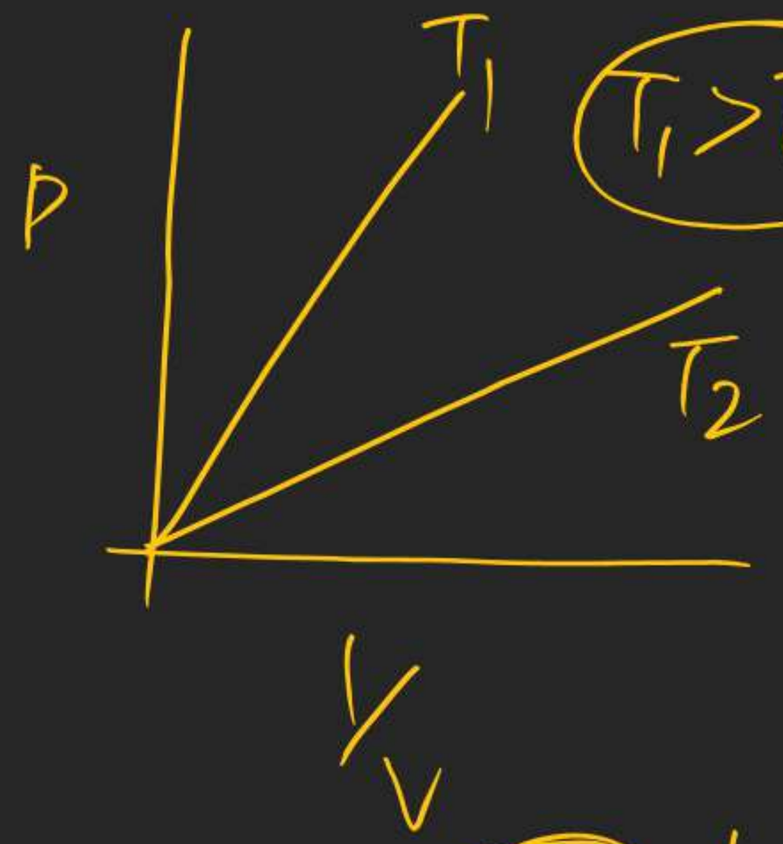
Ideal Gas



$$P = (nRT_2)\,\frac{1}{V}$$

$$P = nRT_1\,\frac{1}{V}$$

$$T_1 > T_2$$



$$T_1 > T_2$$

$$P = nRT\,\frac{1}{V}$$

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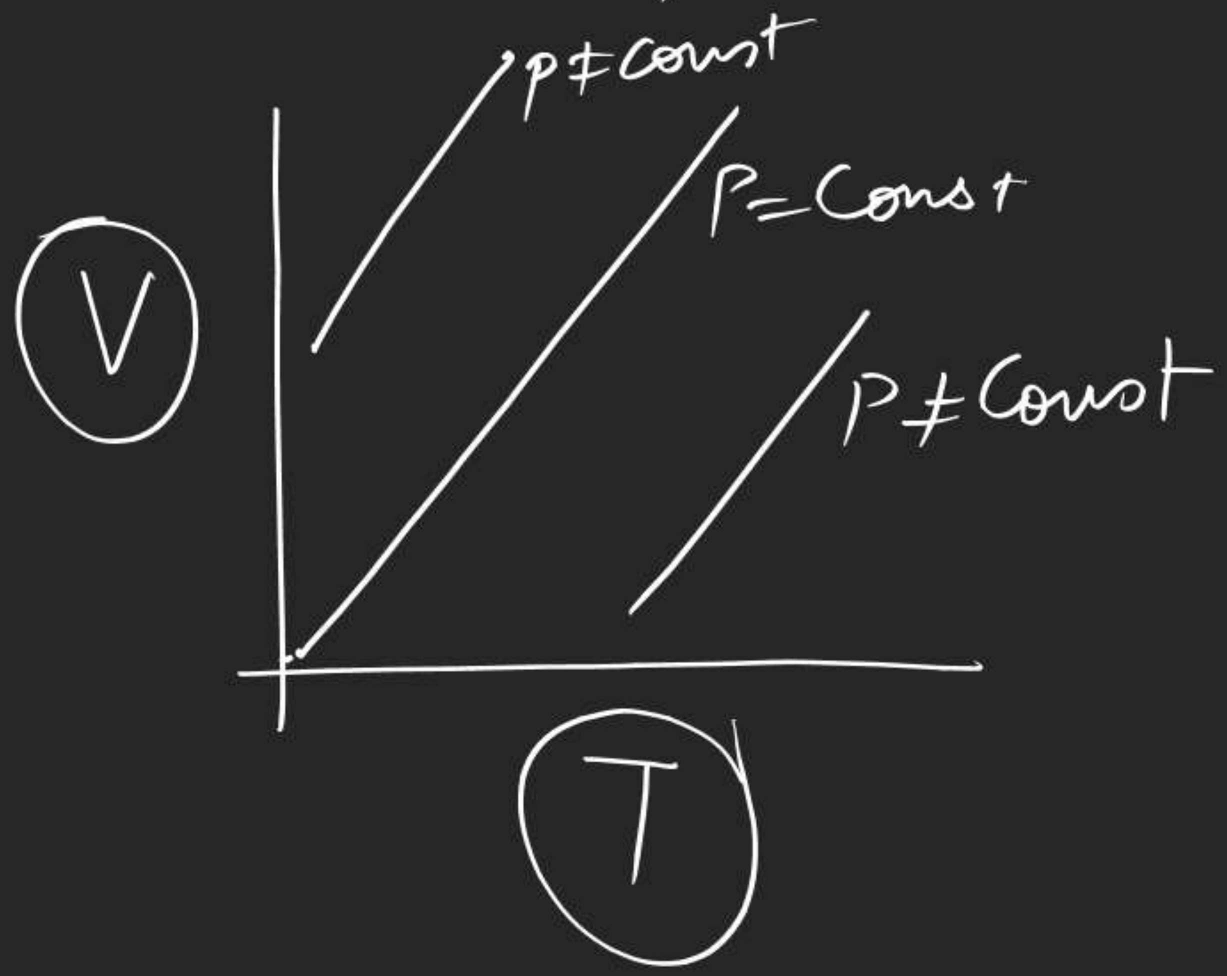
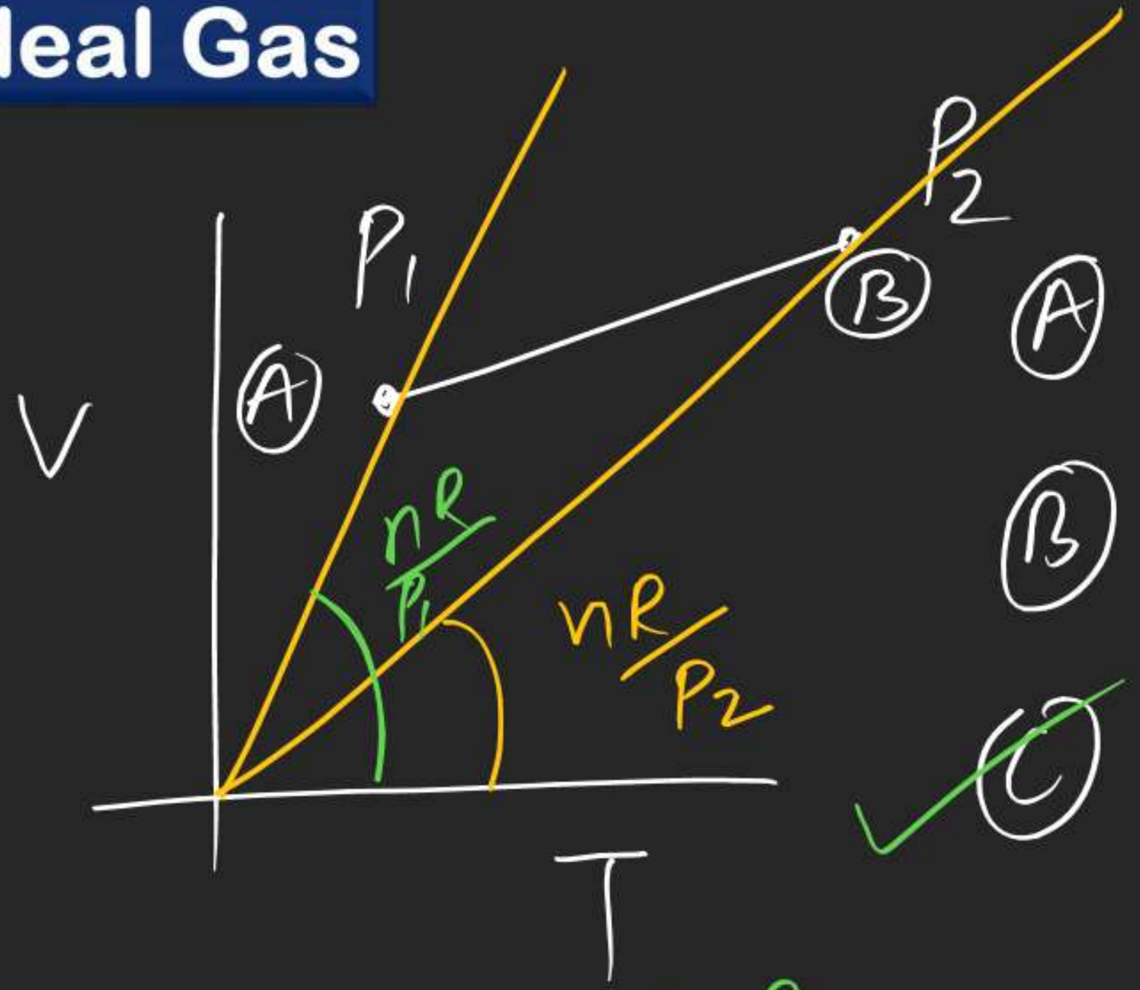
Ideal Gas

$$V = \left(\frac{nR}{P}\right) T$$





(A) $P_1 = P_2$

(B) $P_1 > P_2$

(C) $P_1 < P_2$ ✓

$$\frac{nR}{P_1} > \frac{nR}{P_2}$$

$$P_2 > P_1$$

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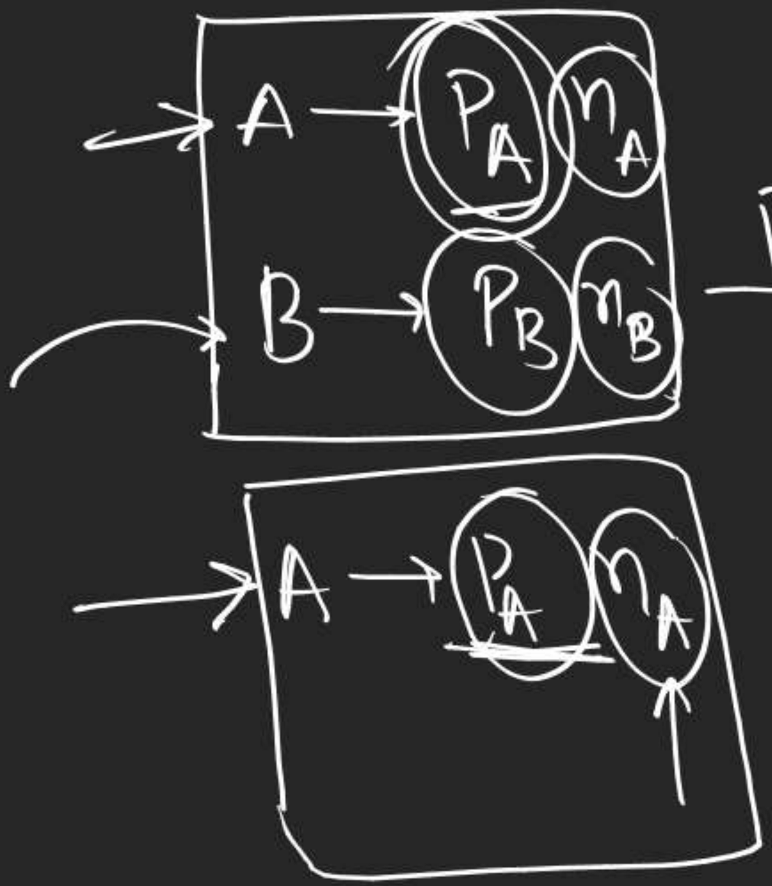
Dalton's law of partial pressure

Total pressure exerted by two or more non-reacting gases is equal to the partial (individual) pressure of component gases



$$P_T = P_A + P_B$$

$$\boxed{P_A V = n_A RT} \quad \text{—— ①}$$

$$\boxed{P_B V = n_B RT} \quad \text{—— ②}$$

$$P_T V = (n_A + n_B) RT \quad \text{—— ③}$$

$$P_T V = P_A V + P_B V$$

$$P_T = P_A + P_B$$

eq ① ÷ eq ③

$$\frac{P_A}{P_T} = \frac{n_A}{n_A + n_B} = \chi_A$$

$$\boxed{P_A = \chi_A P_T}$$

Nishant Jindal

Ideal Gas

(A)
$P = 5$ atm
$V = 2$ lit

(B)
$P = 4$ atm
$P = 4$ lit

$$P_1V_1 = P_2V_2$$

$$5 \times 2 = P_A \times 10$$

$$1 = P_A$$

$$4 \times 4 = P_B \times 10$$

$$1.6 = P_B$$

$P_A = 1$ | $P_B = 1.6$ | P_T

0-I 8, 9, 10
14, 15

S-I 8 — 12

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Ideal Gas