Dalton's Law, Amagat Law of Partial Volume

Course on States of Matter for Class XI

akhilesh • Lesson 7 • July 21, 2021

Q. 1 mol gas at 300K & has vol 8.21 Lit

3 atm

(A) $(1/3)^{rd}$ of original moles escaped.

(B) to $(9/10)^{th}$ of original volume

(C) $P_1V_1 = P_2V_2$

$2 \times 10/9 = 20/9$

(D) in values, threw the Pressure container

$40/9$

find

$\frac{P_2}{P_1} = \frac{n_2}{n_1}$

$\frac{P_2}{3} = \frac{2}{3} =$

$P = 2$

(ii)

(A) 1

(B) 2

(C) 3

(D) None

3 2 20/9 40/9

(iv)

(A) 18/5

(B) 9/5

(C) 20/9

(D) 40/9

① P vs V

② P vs T

③ V vs T

④ PV vs P

$PV = y$

$V = y/x$

$P = x$

$PV = nRT$

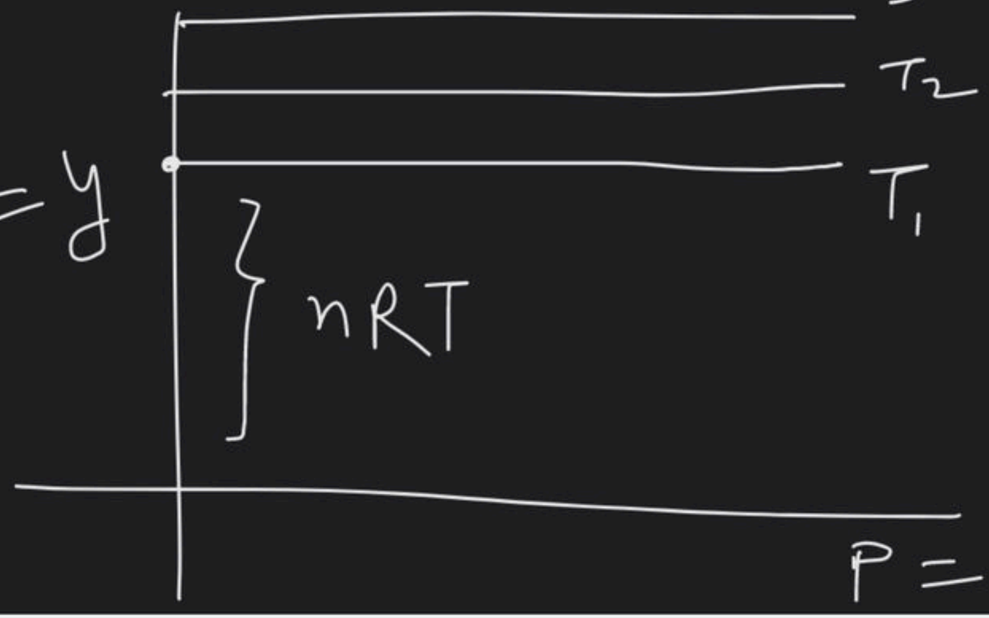
$x\, y/x = nRT$

$y = nRT$

$PV = nRT$

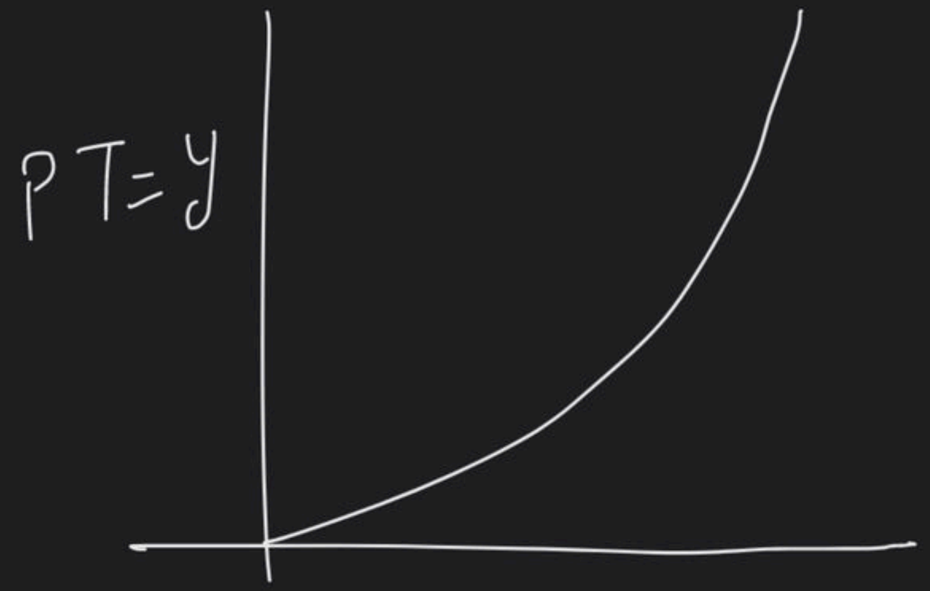
$PV = \text{Const}$

$PV = y$



$T_3 > T_2 > T_1$

(5) PT vs T



$PT = y$

$T = x$

$P = y/x$

$\Downarrow$

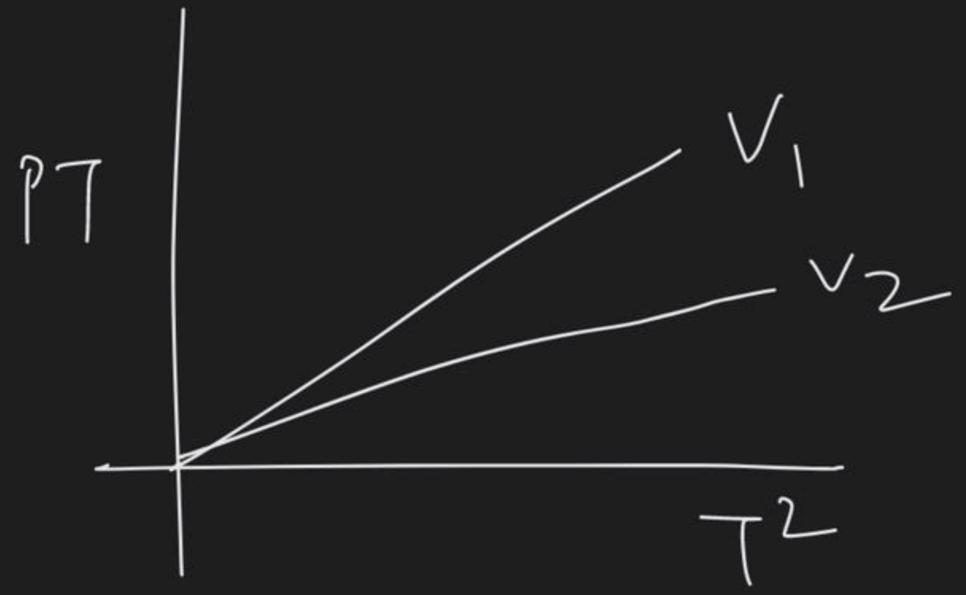
$\frac{y}{x} \cdot V = nRx$

$y = \left(\frac{nR}{V}\right) x^2$

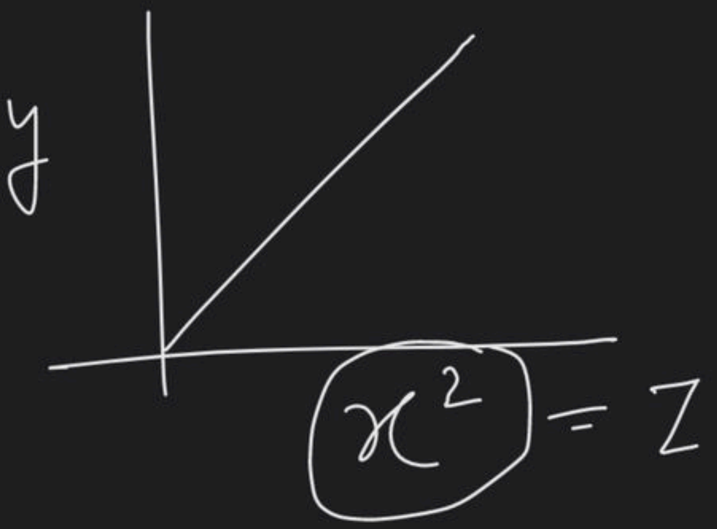
$PT = \frac{nR}{V} T^2$

(6) pT vs T^2

$y = x^2 = z$



$V_2 > V_1$



$pT = y$

$p = y/\sqrt{x}$

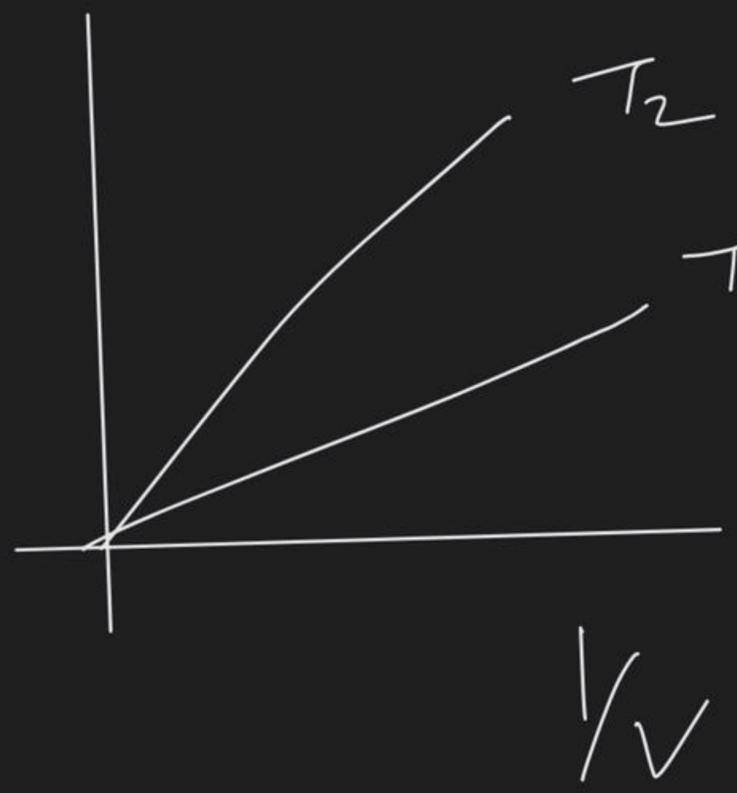
$T^2 = x$

$T = \sqrt{x}$

$y/\sqrt{x} = \frac{nR}{V}\sqrt{x}$

(7) P vs $1/V$

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



$T_2 > T_1$

(8) $\log P$ vs $\log V$

$$PV = nRT$$

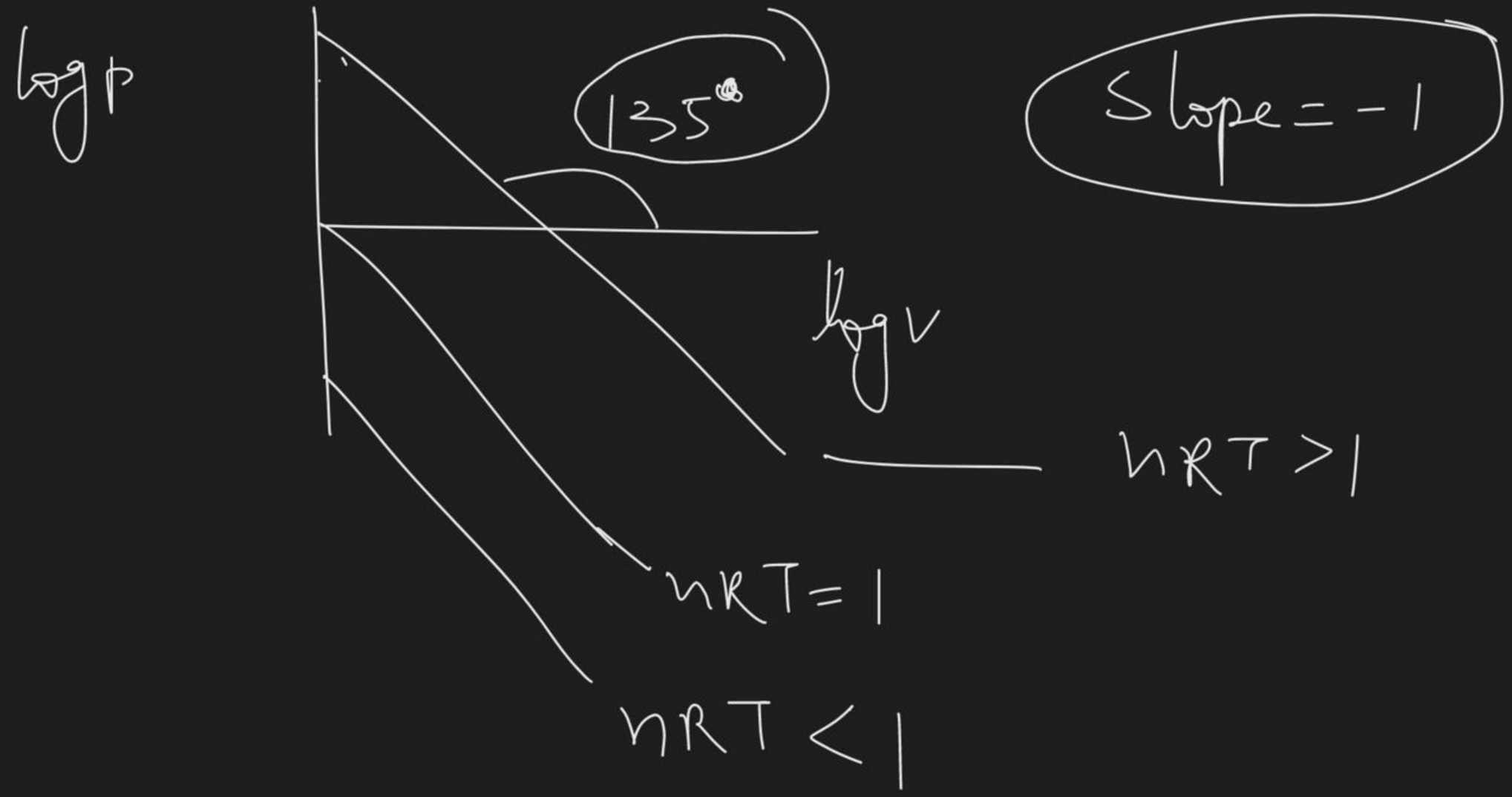
$$\log(PV) = \log(nRT)$$

$$\log P = -\log V + \log(nRT)$$

$$y = -x + \underline{\log(nRT)}$$

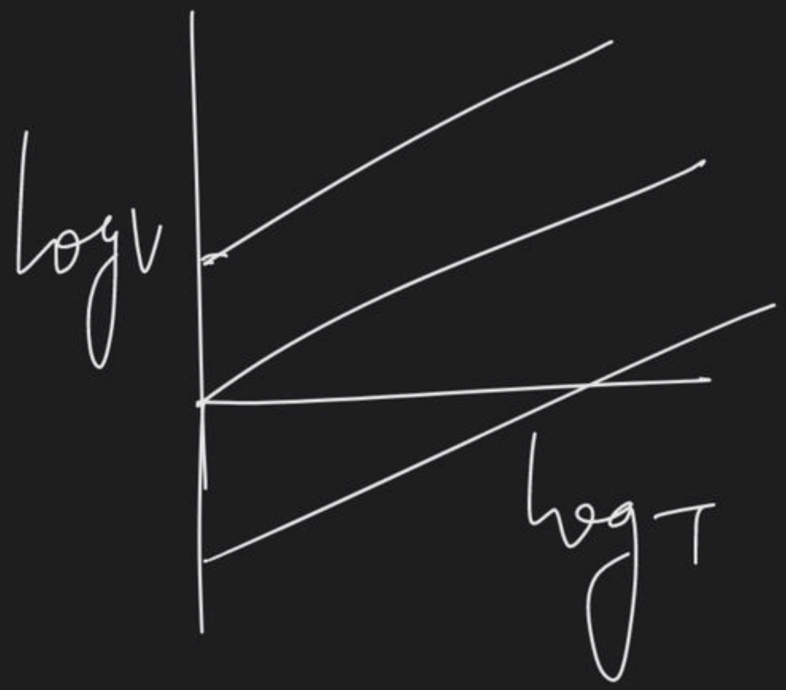
$$\log(xy) = \log x + \log y$$

$$\log(x/y) = \log x - \log y$$


log p
135°
Slope = -1
log v
n RT > 1
n RT = 1
n RT < 1

⑨ $\log V$ vs $\log T$

log



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

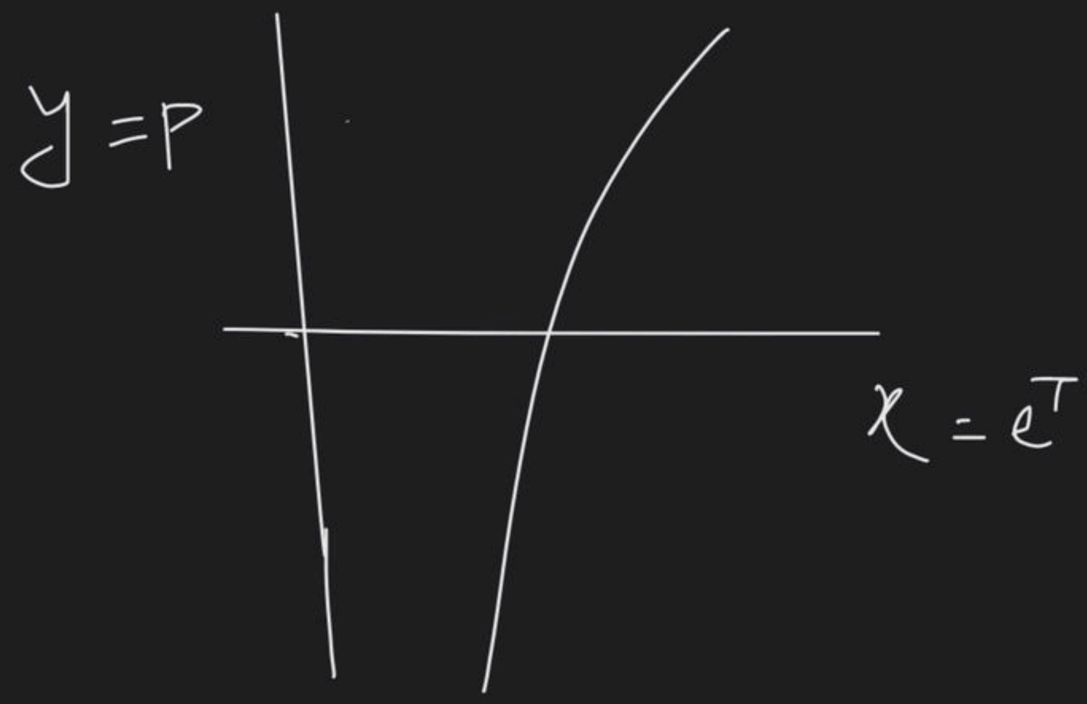
(10) P vs e^T

$P = y$ $\quad e^T = x$

$T = \ln x$

$PV = nRT$

$y = \frac{nR}{V} \ln x$

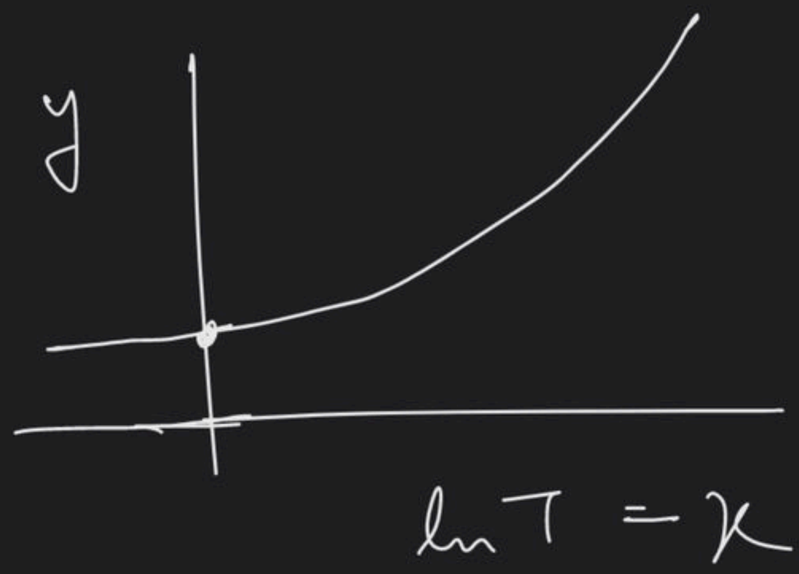


(11) P vs $\ln T$

$P = y$

$\ln T = x$

$T = e^x$



$PV = nRT$

$y = \frac{nR}{V} e^x$

$y = mx$

m = variable

Curve

st line ?

if m = const

St line passing through origin

if $m \neq$ Const

($m \neq$ slope)

slope may be const

(st line)

but not passing origin

slope may vary

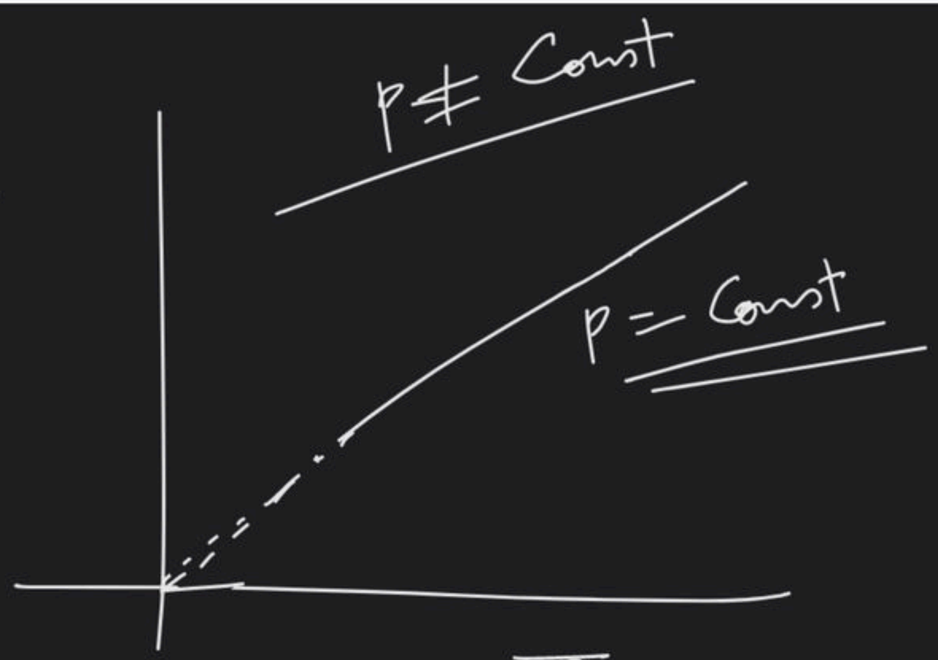
$$m = 3 + \frac{2}{x}$$

$$y = \left(3 + \frac{2}{x}\right) x$$

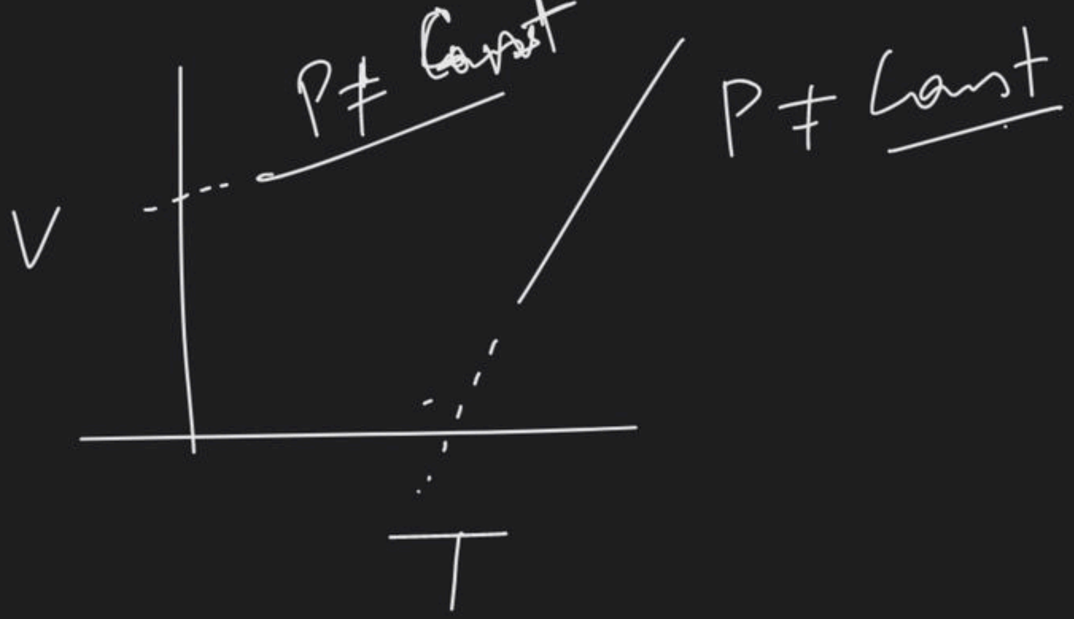
$$y = 3x + 2$$

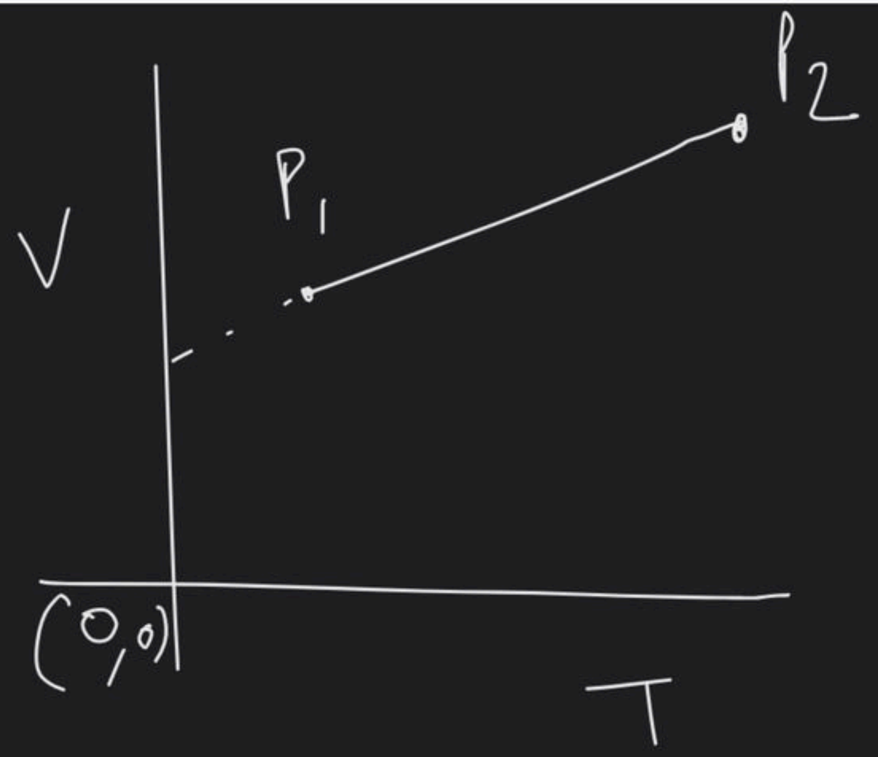
slope = 3 = Const

$\eta = \text{Const}$



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





(A) $P_1 = P_2$

(B) $P_1 > P_2$

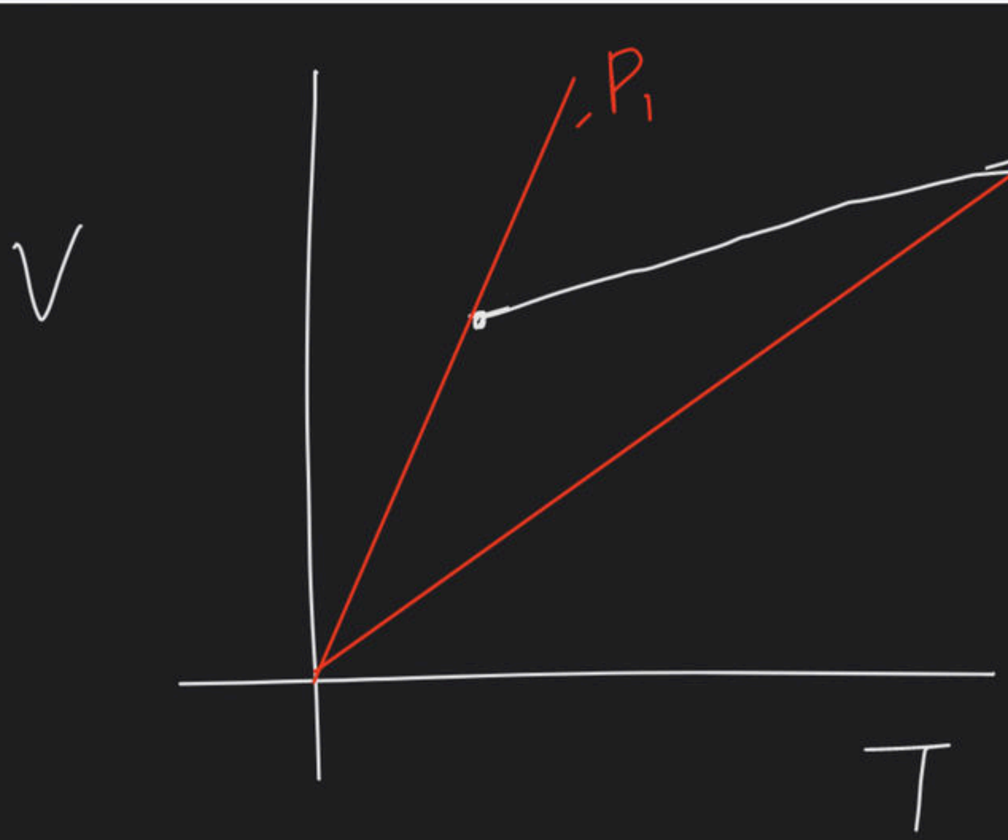
(C) $P_1 < P_2$

(D) Can't determine

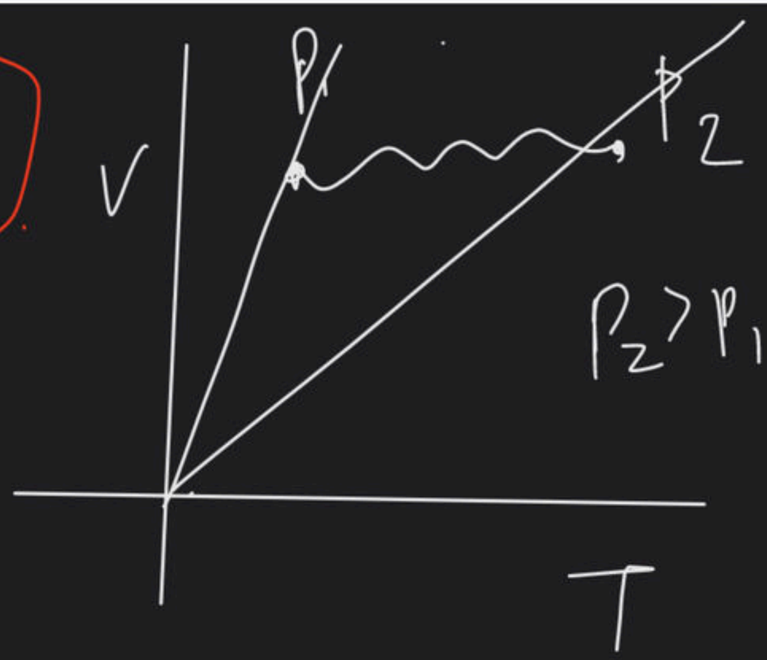
$$V = mT + C$$

$$\frac{nRT}{P} = mT + C$$

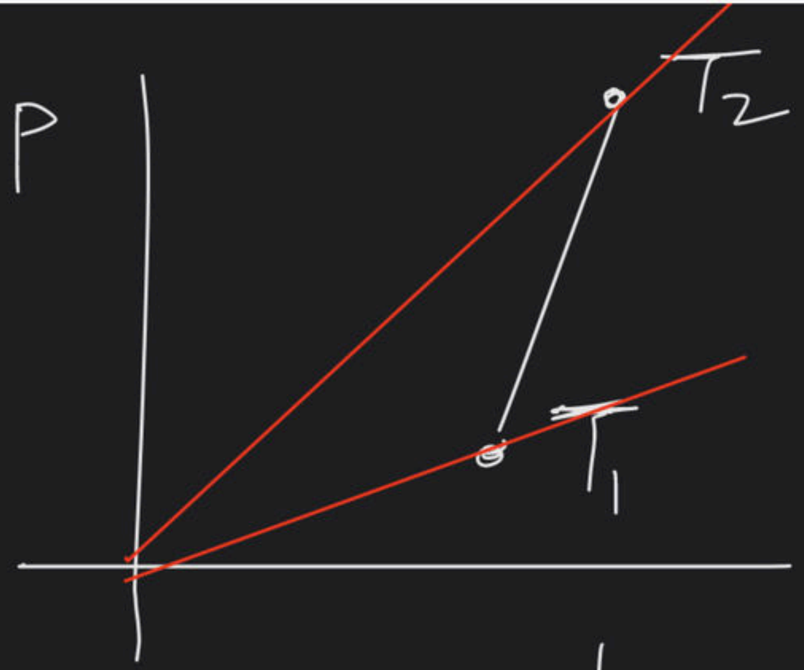
$$\frac{nR}{P} = m + \left(\frac{C}{T}\right)$$



$P_2 > P_1$



$P_2 > P_1$

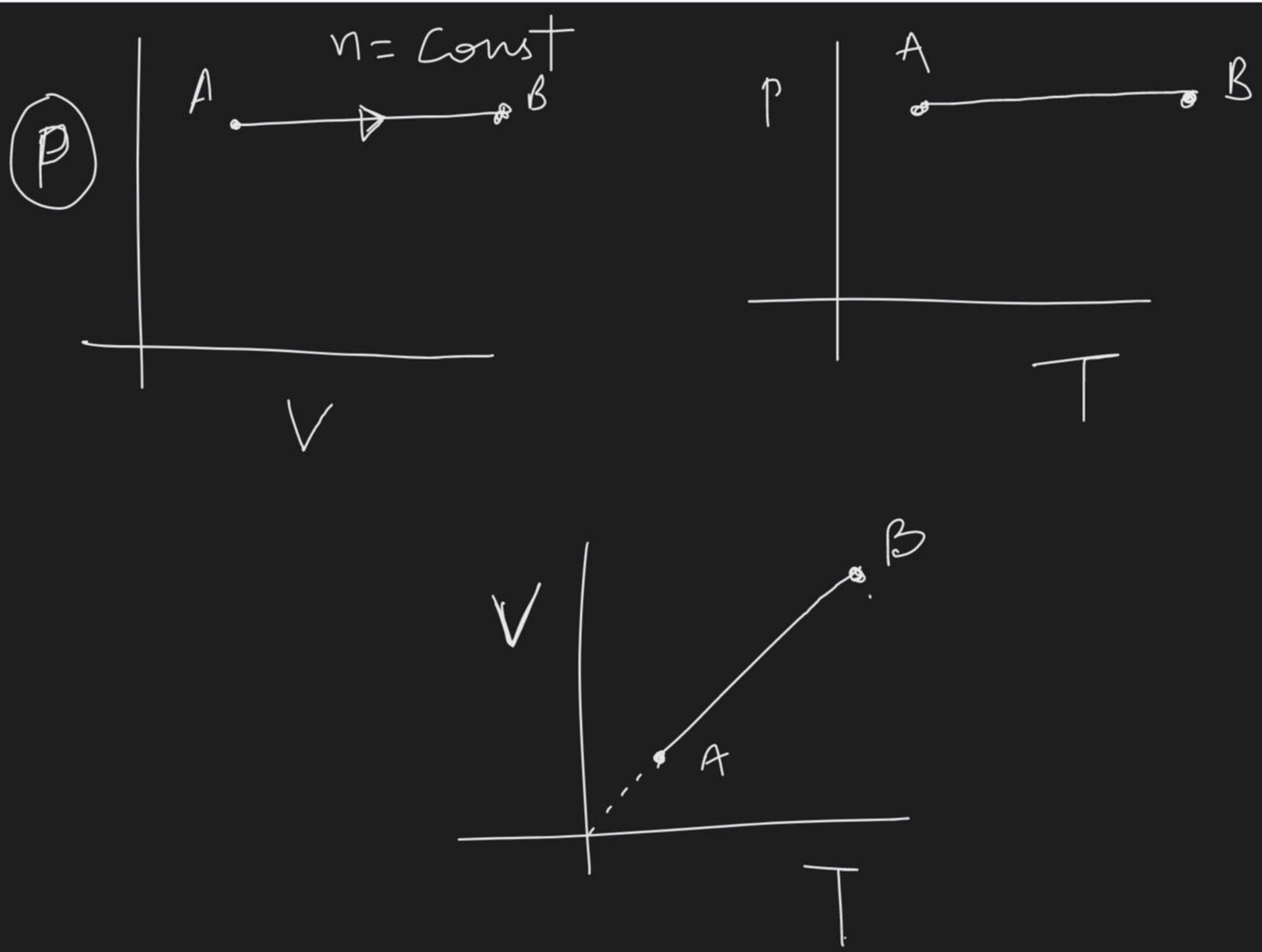


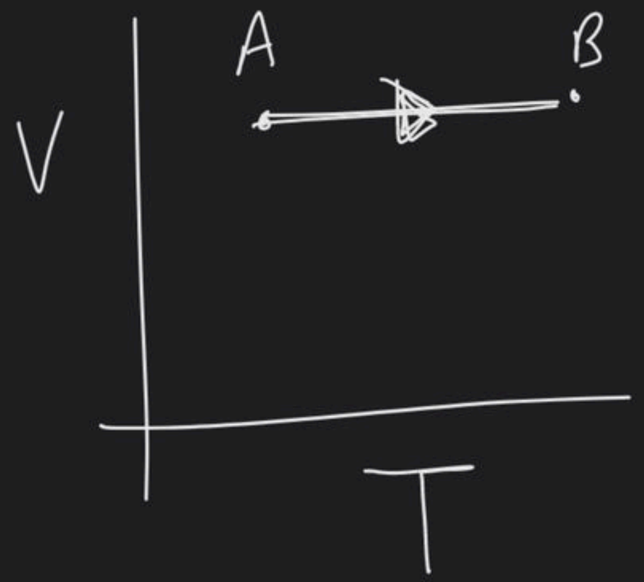
$$\log(k)$$

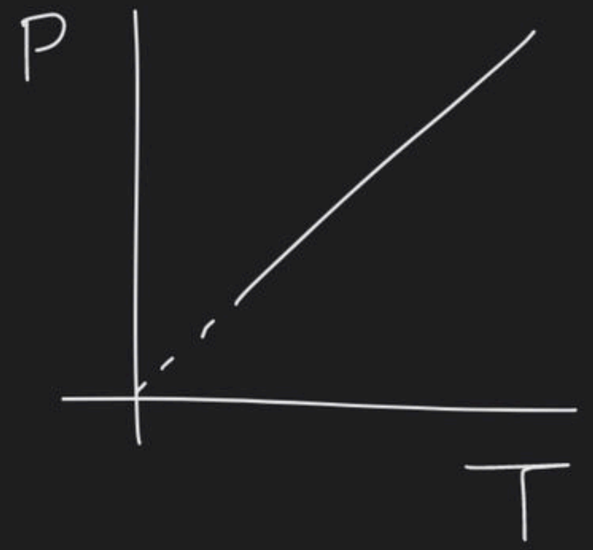
$$\log(1) = 0$$

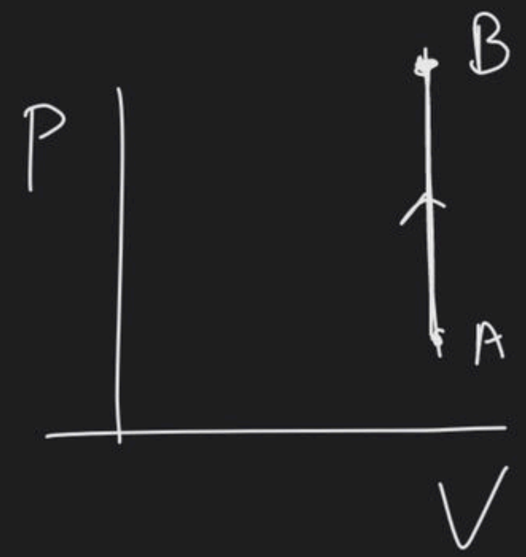
$$P = nRT \quad \frac{1}{V}$$

$$T_2 > T_1$$


n = Const
A
B
p
V
A
B
p
T
B
V
A
T


A
B
V
T


P
T


B
P
A
V

S-1 1-11

0-1 1-8