

Берілгенге

$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{K}}$$

$$V = 0,5 \text{ м}^3$$

$$P = 250 \text{ кПа}$$

$$T/K \quad n = ?$$

$$\Delta n = ?$$

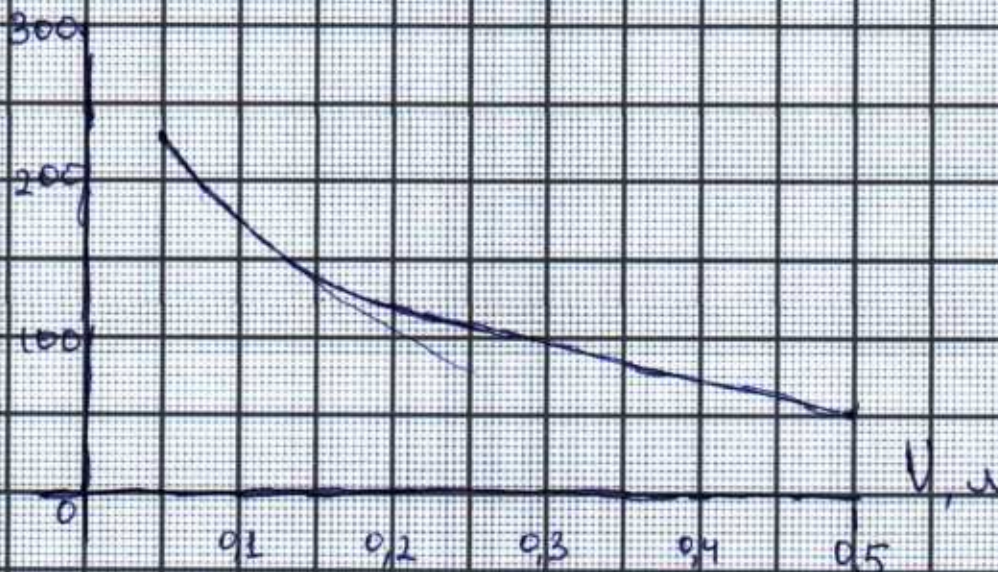
Шешуі.

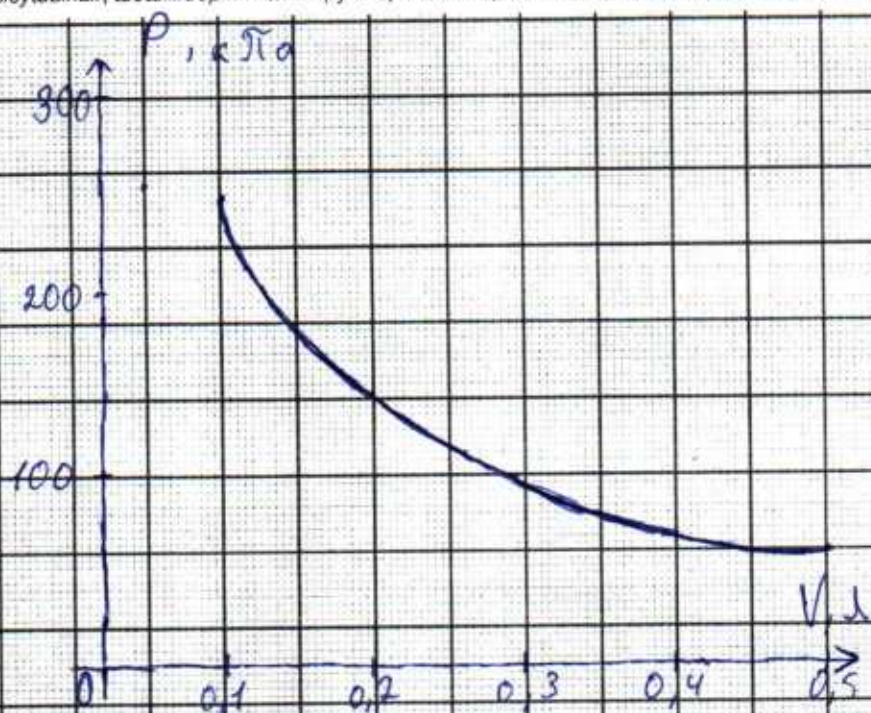
$$n = \frac{(T - P) \cdot V}{R} = \frac{(300 \pm 2 - 250) \cdot 0,5 \text{ м}^3}{8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{K}}} =$$

$$= \frac{50 \cdot 0,5 \text{ м}^3}{8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{K}}} = \frac{25}{8,314} \approx 3,12$$

$$n_{\Delta} = \frac{(T - P) \cdot V}{R} = \frac{(300 - 2 \text{ K} - 250 \text{ кПа}) \cdot 0,5 \text{ м}^3}{8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{K}}} = \frac{48 \cdot 0,5}{8,314} =$$

$$= \frac{24}{8,314} \approx 2,8$$





Берілгені:

$$T = 300 \pm 2 \text{ К}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{К)}$$

$$V = 0,5 \text{ л}$$

$$P = 250 \text{ кПа}$$

$$n = ? \text{ моль}$$

$$m = ? \text{ моль}$$

Шешуі:

$$n = \frac{PV}{RT} = \frac{250 \cdot 0,5}{300 \pm 2 \cdot 8,314} \quad \left[\begin{array}{l} n_1 = \frac{250 \cdot 0,5}{300 + 2 \cdot 8,314} = 5027,656 \\ n_2 = \frac{250 \cdot 0,5}{300 - 2 \cdot 8,314} = 4955,144 \end{array} \right]$$

моль

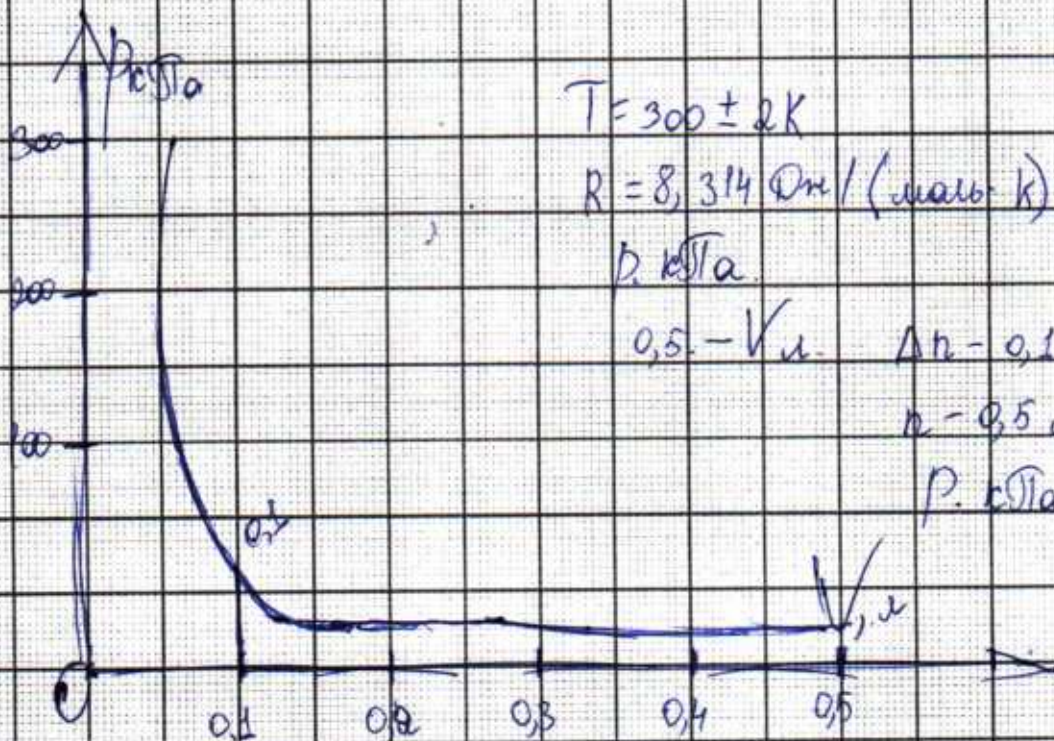
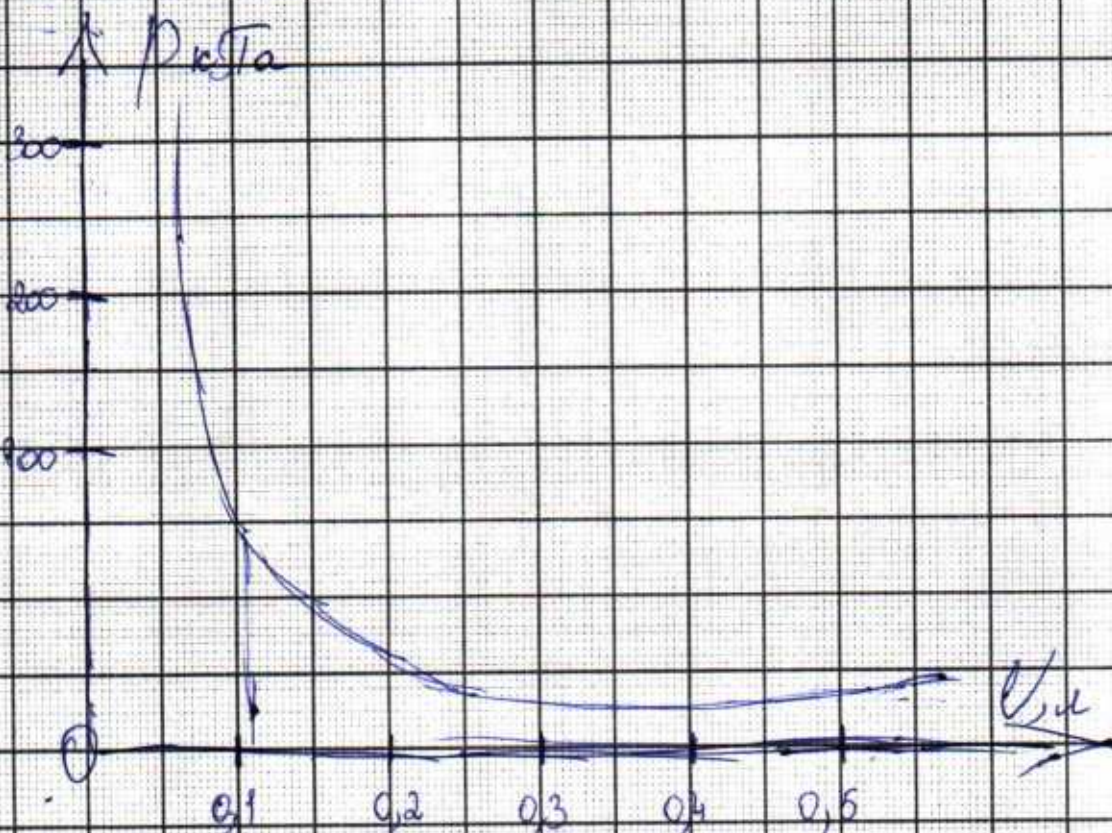
моль

$$n = n_1 + n_2 = 5021,656 \text{ моль} + 4955,144 \text{ моль} = 9976,8$$

моль

$$\Delta n = \frac{n_1 + n_2}{p} = \frac{5021,656 + 4955,144}{250} = 39,9072 \text{ моль}$$

Б1 есеп.



$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)}$$

$p, \text{ kPa}$

$0,5 - V, \text{ л}$ $\Delta n - 0,1 \text{ моль}$

$n - 0,5 \text{ моль}$

$p, \text{ kPa} - 300 \text{ Па}$

$$T = 300 \pm 2 \text{ K}$$

шешуі

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)}$$

$$R_{\text{мол}} = \frac{298 - 250}{8,314} = 65,9 \text{ Дж/К}$$

$$V = 0,5$$

$$P = 250 \text{ кПа}$$

$$\Delta n = 0,5 \cdot \frac{65,9}{250} = 0,13 \text{ Дж/кПа}$$

$$R_{\text{мол}}?$$

$$\text{шығарса: } R_{\text{мол}} = 65,9 \text{ Дж/К}$$

$$\Delta n?$$

$$\Delta n = 0,13 \text{ Дж/кПа}$$

4. Есеп

Берілгені:

$$T = 300 \pm 2 \text{ K} \quad (298 - \text{айналдыру})$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)}$$

$$V = 0,5 \text{ л (графикпені)}$$

$$P = 250 \text{ кПа (графикпені)}$$

$$T/P \text{ (табу керек):}$$

$$n_{\text{моль}} - ? \quad \Delta n - ?$$

Шешуі:

$$n_{\text{моль}} = \frac{298 - 250}{8,314} = 65,9 \text{ Дж/К}$$

$$\Delta n = \frac{0,5 \cdot 65,9}{250} = 0,13 \text{ Дж/кПа}$$

$$\text{Жауабы: } n_{\text{моль}} = 65,9 \text{ Дж/К}$$

$$\Delta n = 0,13 \text{ Дж/кПа}$$

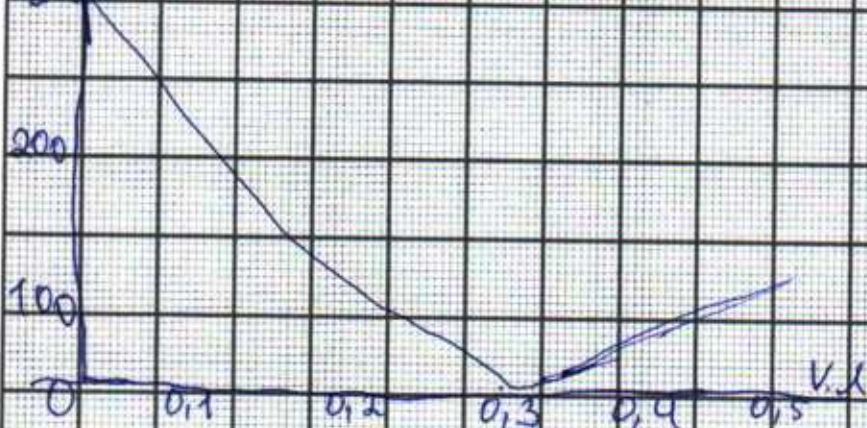
$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж / (моль K)}$$

$$n = \frac{300}{1000} = 0,3 \text{ моль}$$

$$\Delta n = \frac{R}{n} = \frac{8,314}{0,3} = 6,3917$$

300 P, кПа



Терминдік сөздер:

Берілген: изотермиялық процесс $\Rightarrow$

$T = 300 \pm 2 \text{ K}$ n моль (идеал)

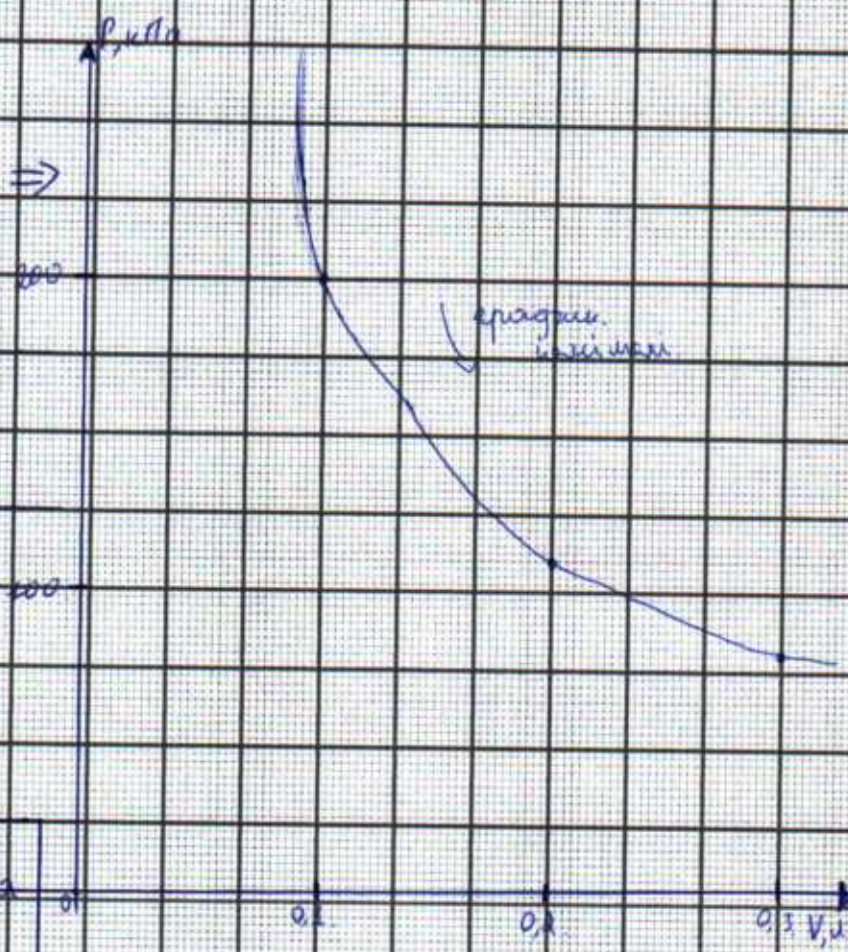
$R = 8.314 \text{ Дж/(моль} \cdot \text{K)}$
моль көлемі:

n моль мөлшері?

Δn қанша?

Формулалар:

$$y(t) = V_0 \sin \omega t + \frac{y_0}{x}$$



Шешуі: Есептің шарты берілген

процесс $T = 300 \pm 2 \text{ K}$ температурада

жұмыс изотермиялық биіктігі Δn

Жұмыс істеген газ тұрақты $R = 8.314 \text{ Дж/(моль} \cdot \text{K)}$

$P = 0.1$ $V = 2200$ деп алатын болсақ,
 $8.314 \cdot 0.1 \cdot 2200 \approx 1829.8 \Rightarrow$

$$2k = 1829.8 \cdot 2 = 3659.6$$

$$1) T = 300 + 2 \text{ K} \Rightarrow 2) T = 300 - 2 \text{ K} \Rightarrow$$

$$300 + 3659.6 =$$

$$300 - 3659.6 =$$

$$\text{Жауабы } 632.56$$

$$= 32.56 \text{ Дж}$$

P, kPa	0.1	0.2	0.3	0.4	0.5
V, m^3	≈ 2200	≈ 1100	≈ 730	≈ 550	≈ 440

01

$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)}$$

$$n_1: n_2; \Delta n = ?$$

$$n_1 = \frac{T_1}{R}$$

$$n_2 = \frac{T_2}{R}$$

$$T_1 = 300 + 2 = 302$$

$$T_2 = 300 - 2 = 298$$

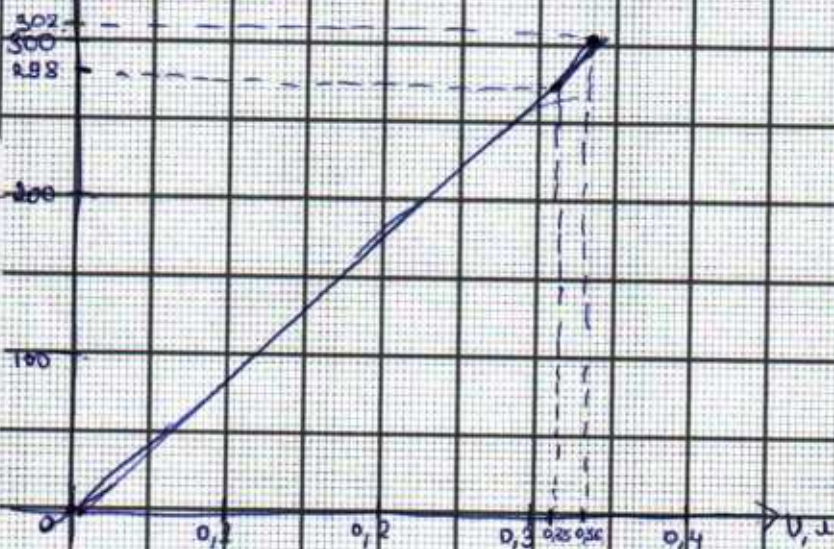
$$n_1 = \frac{302}{8,314} = 0,36 \cdot 10^2 = 36,32$$

$$n_2 = \frac{298}{8,314} = 0,35 \cdot 10^2 = 35,34$$

$$\Delta n = n_2 - n_1 = 0,35 \cdot 10^2 - 0,36 \cdot 10^2 = -0,01 \cdot 10^2 = -1$$

T	$T_1 = 302$	$T_2 = 298$
p, кПа		
R	$0,36 \cdot 10^2$	$0,35 \cdot 10^2$
V, л		

P, кПа



n: Δn бағамы $-0,01 \cdot 10^2 = -1$
жоспары дәйексіздігі n мәніне $0,36 \cdot 10^2 = 36$

Есеп 1

Берілгені

$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж/моль} \cdot \text{K}$$

$P, \text{ кПа}$

300

200

100

0

0.1

0.2

0.3

0.4

0.5

$V, \text{ л}$

$n, \text{ моль}$

$$T = 300 \pm 2 \text{ K}$$

$$n = \frac{R}{T} = \frac{8,314}{300 \pm 2 \text{ K}} = 36.10777$$

$$T = 300 \pm 2 \text{ K}$$

$$n = \frac{R}{T} = \frac{8,314}{300 \pm 2 \text{ K}} = 36.059658$$

$$T = 300 \pm 2 \text{ K}$$

$$T = 300 + 0,2$$

$$T = 300 - 0,2$$

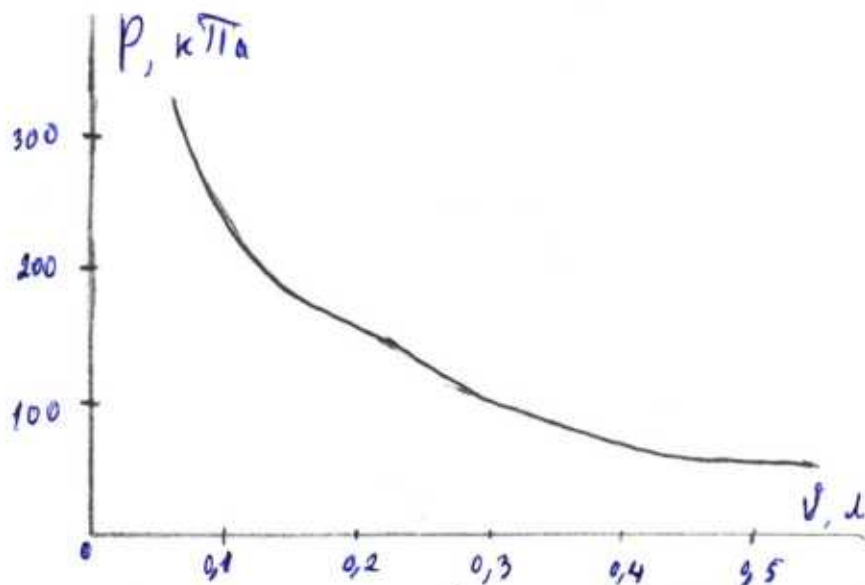
Берілгені:

$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)}$$

$$m/k: n - ?$$

$$\Delta n - ?$$



$$n = \frac{PV}{RT}$$

$$V = \frac{n}{RT}$$

$$P = \frac{PV}{RT}, n = \frac{PV}{RT}$$

$$P_{орт} = \frac{13,8}{3} = 4,6$$

$$n = \frac{PV}{RT}$$

$$\frac{\Delta T}{T} = 14,09 + 144 \text{ K}$$

$$T = 14,09 + 144 \text{ K}$$

$$T = (300 \pm 2 \text{ K})$$

$$\Delta n_{орт} = \frac{1,3 \cdot 3,2}{3} = 0,9$$

№1 Берілгені

$$V = 0,2 \cdot 10^{-3} \text{ м}^3$$

$$T = 300 \text{ K}$$

$$R = 8,314 \text{ Дж/моль} \cdot \text{K}$$

$$p = 25 \cdot 10^5$$

$$m/\text{K} \quad n = ?$$

$$\Delta n = ?$$

Шешуі

$$n = \frac{1}{3} \cdot V p T = \frac{0,2 \cdot 10^{-3} \cdot 10^5}{3 \cdot 300} = \frac{0,2 \cdot 0,3 \cdot 10^5}{3}$$

$$= \frac{2 \cdot 3 \cdot 10^3}{3} = 2000 \text{ моль}$$

$$n = \frac{1}{3} V p T = \frac{1 \cdot 0,2 \cdot 302 \cdot 10^5}{3}$$

$$= \frac{20 \cdot 302}{3} = 2013 \text{ моль}$$

$$\Delta n = n_2 - n_1 = 2013 - 2000 = 13$$

$$\Delta n = 13 \cdot 2 = 26$$

$$n/\text{бы} \quad n = 2000 \text{ моль}$$

$$\Delta n = 26 \text{ моль}$$

Берілгені

$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж / (моль} \cdot \text{K)}$$

$$T \text{ мкм: } n$$

$$\Delta n$$

III:

$$R = \frac{Q}{n \cdot T} = 8,314 = \frac{Q}{n \cdot 302}$$

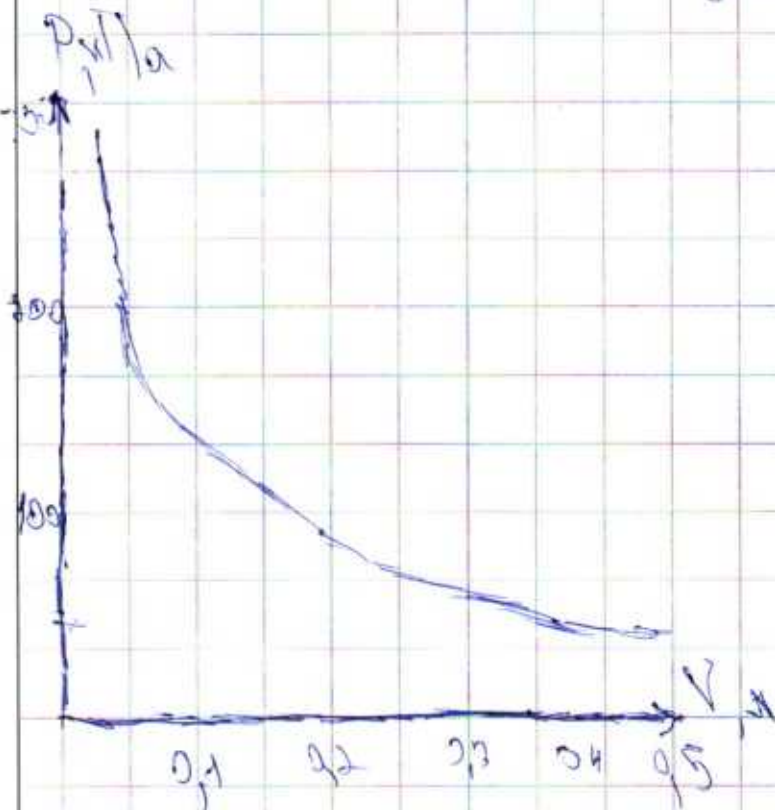
$$Q = n \cdot 302 \cdot 8,314$$

$$Q = n \cdot 2511$$

$$n = \frac{Q}{2511} \quad Q = P$$

$$Q = 2500 \cdot T_0 = 2500000$$

$$n = \frac{2500000}{2511} = 9925 \text{ моль}$$



P	2500	1250	833	625	500
V	0,1	0,2	0,3	0,4	0,5

$$\Delta n = 250 \pm 2$$

$$T = 300 \text{ K}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{К)}$$

$n = ?$

$$V = 0,1 \text{ м}^3 : 0,1 \cdot 10^3$$

$$P = 230 \cdot 10^3$$

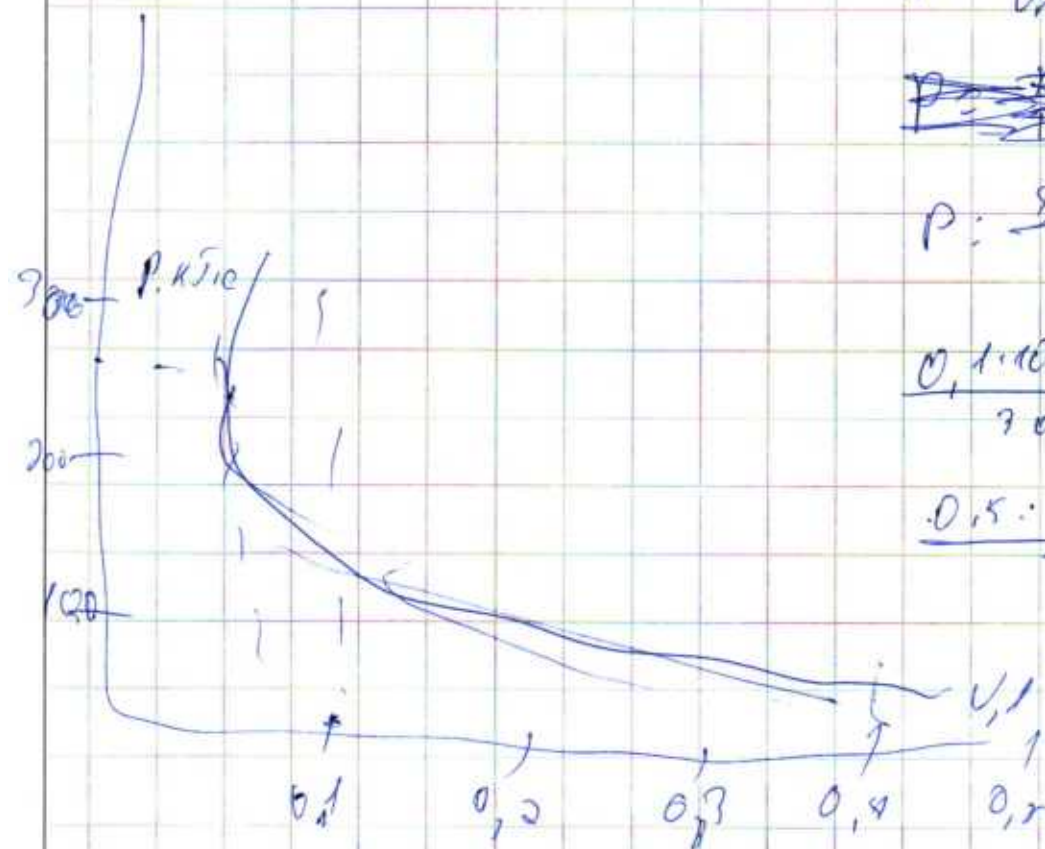
$$n = \frac{V}{V_n} = \frac{0,1 \cdot 10^3}{20,4}$$

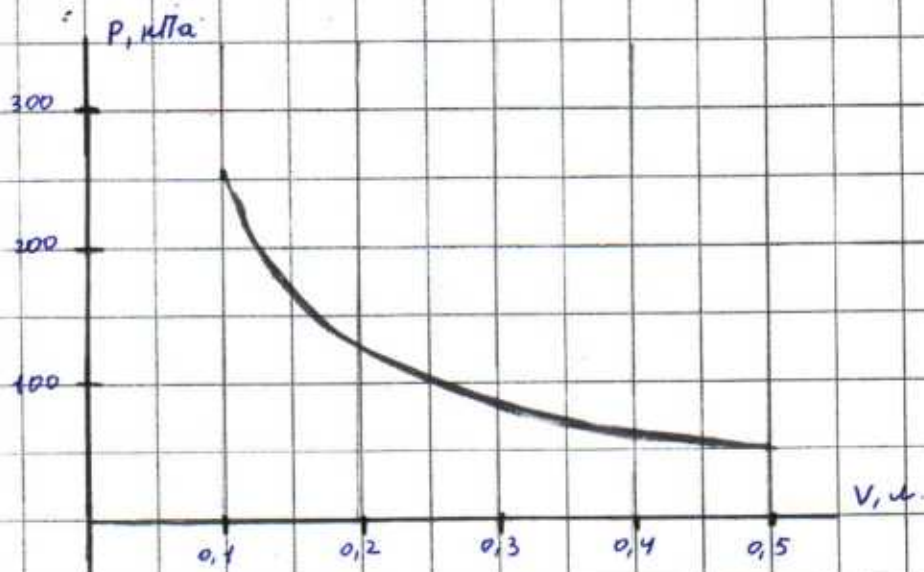
~~Р = 230~~

$$P = \frac{8,314}{300} = 27,714$$

$$\frac{0,1 \cdot 10^3 \cdot 27,7}{300} = 9,23 \cdot 10^3$$

$$\frac{0,5 \cdot 10^3 \cdot 27,7}{300} = 46,15 \cdot 10^3$$





Бері: n -моль идеал газ ұстiвiн жасаған изотермиялыз процестiң графигi берiлгенi. Процесс $T = 300 \pm 2\text{ К}$ температура бойынша жүзедi. асадо: $R = 8,314 \text{ Дж/(моль} \cdot \text{К)}$ универсал газ тұрақтысы.

Табу керек: n -моль мөлшерiн, Δp -фатмелiгiн анықтау?

$$p = \frac{m}{V}; \quad m = pV$$

$$\begin{aligned} m &= 300 \cdot 0,5 = 150 \\ m &= 200 \cdot 0,5 = 100 \\ m &= 100 \cdot 0,5 = 50 \\ m &= 300 \end{aligned}$$

$$\begin{aligned} m &= 300 \cdot 0,2 = 60 \\ m &= 200 \cdot 0,2 = 40 \\ m &= 100 \cdot 0,2 = 20 \\ m &= 120 \end{aligned}$$

$$\begin{aligned} m &= 300 \cdot 0,4 = 120 \\ m &= 200 \cdot 0,4 = 80 \\ m &= 100 \cdot 0,4 = 40 \\ m &= 240 \end{aligned}$$

$$\begin{aligned} m &= 300 \cdot 0,1 = 30 \\ m &= 200 \cdot 0,1 = 20 \\ m &= 100 \cdot 0,1 = 10 \\ m &= 60 \end{aligned}$$

$$\begin{aligned} m &= 300 \cdot 0,3 = 90 \\ m &= 200 \cdot 0,3 = 60 \\ m &= 100 \cdot 0,3 = 30 \\ m &= 180 \end{aligned}$$

$$m = 300 + 240 + 180 + 120 + 60 = 900$$

$$n = \frac{m}{V} = \frac{900}{0,1} = 9000$$

$$n = \frac{m}{V} = \frac{900}{0,2} = 4500$$

$$n = \frac{m}{V} = \frac{900}{0,3} = 3000$$

$$n = \frac{m}{V} = \frac{900}{0,4} = 2250$$

$$n = \frac{m}{V} = \frac{900}{0,5} = 1800$$

$$\Delta n = n_1 + n_2 + n_3 + n_4 + n_5 = 9000 + 4500 + 3000 + 2250 + 1800 = 20550 \text{ моль}$$

$$n = \frac{m}{R} = \frac{900}{8,314} = 108,25$$

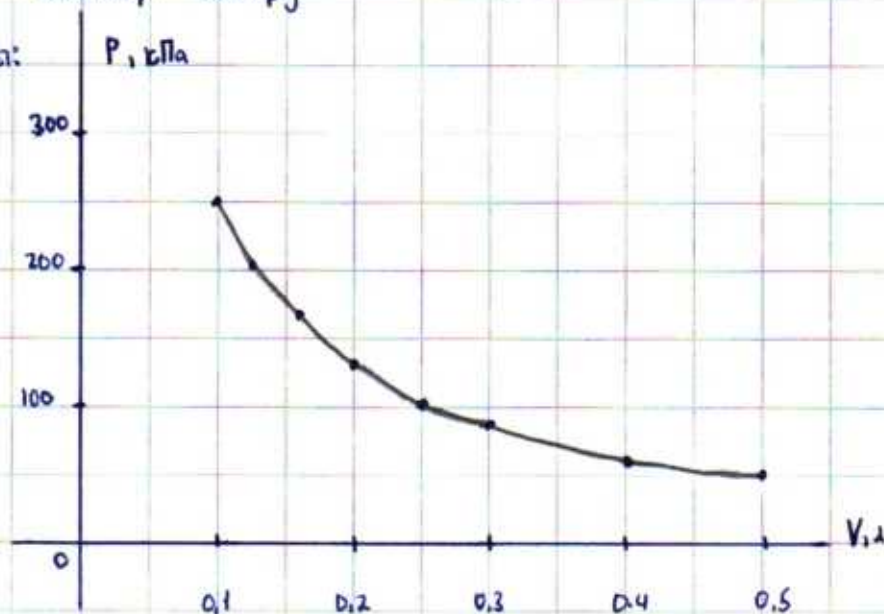
Эксперименттегі сәйес

Тақырыбы: Изотермиялық процестің η мөлшерін табу

Мақсаты: Изотермиялық процестің графигі бойынша кестелер келтіру

Тапсырма: Идеал газдың η моль мөлшерін, $\Delta\eta$ қателігін растайтын графиктер мен кестелер келтіру

Құралдар:



$$T = 300 \pm 2 \text{ K}$$

$$R = 8,314 \text{ Дж/(моль} \cdot \text{K)} \text{ универсальн газ тұрақтысы}$$

P	кПа	250	170	120	90	70	
V	л	0,1	0,2	0,3	0,4	0,5	

$$\eta = \frac{A_{\eta}}{A_T} \cdot 100\%$$

$$T = 2\pi \sqrt{\frac{l}{g}}$$

$$g = 9,8$$

немесе

$$g \approx 10$$

$$\pi = 3,14 \text{ тұрақты}$$

$$A = F \cos \alpha$$

$$\eta_1 \sin \alpha = \eta_2 \sin \beta$$

$$\rho = \frac{m}{V}$$

$$\eta = \frac{\mu}{m}$$

$$\Delta \eta = \eta_1 - \eta_2$$

$$\eta = \frac{RV}{P} \cdot T$$

$$\eta = \frac{R \cdot T}{P} \cdot T$$

$$\eta_1 = \frac{R \cdot T}{P_1} \cdot T = \frac{8,314 \cdot 0,1}{250} \cdot 302 = 0$$

$$\eta_1 = \frac{P_1 R}{T} \cdot V_1 = \frac{250 \cdot 8,314 \text{ Дж/моль} \cdot \text{К}}{302} \cdot 0,1 = 100\% = 0,68 \cdot 100\% = 68\%$$

$$\eta_2 = \frac{P_2 R}{T} \cdot V_2 = \frac{120 \cdot 8,314 \text{ Дж/моль} \cdot \text{К}}{302} \cdot 0,2 = 100\% = 0,66 \cdot 100\% = 66\%$$

$$\eta_3 = \frac{P_3 R}{T} \cdot V_3 = \frac{80 \cdot 8,314 \text{ Дж/моль} \cdot \text{К}}{302} \cdot 0,3 = 100\% = 0,88 \cdot 100\% = 88\%$$

$$\eta_4 = \frac{P_4 R}{T} \cdot V_4 = \frac{60 \cdot 8,314 \text{ Дж/моль} \cdot \text{К}}{302} \cdot 0,4 = 100\% = 0,66 \cdot 100\% = 66\%$$

$$\eta_5 = \frac{P_5 R}{T} \cdot V_5 = \frac{50 \cdot 8,314 \text{ Дж/моль} \cdot \text{К}}{302} \cdot 0,5 = 100\% = 0,68 \cdot 100\% = 68\%$$

$$\Delta \eta = \eta_2 - \eta_1 = 66\% - 68\% = -2\%$$

$$PV_2 = 250 \cdot 0,1 = 25$$

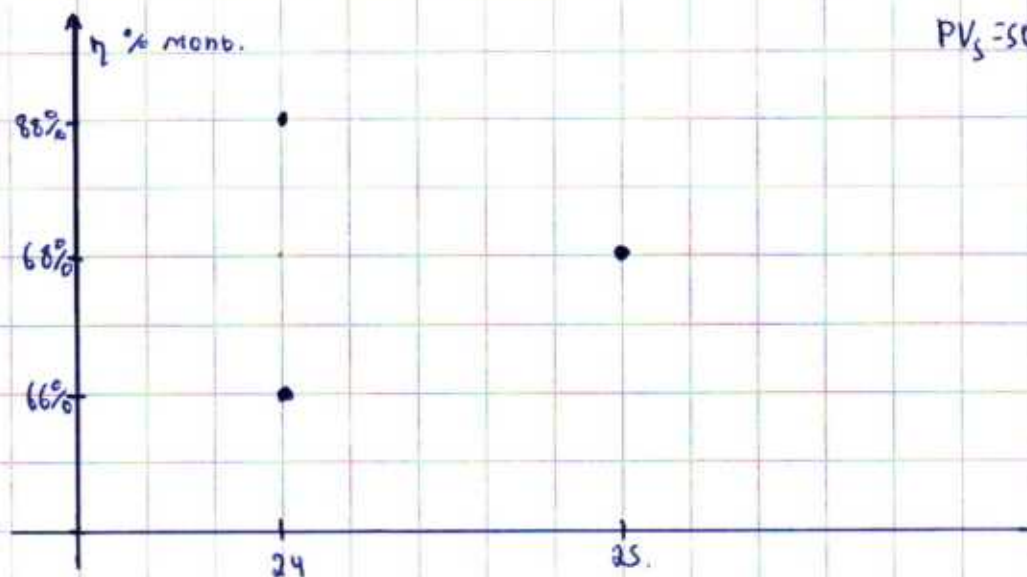
$$PV_2 = 120 \cdot 0,2 = 24$$

$$PV_3 = 80 \cdot 0,3 = 24$$

$$PV_4 = 60 \cdot 0,4 = 24$$

$$PV_5 = 50 \cdot 0,5 = 25$$

η_1	η_2	η_3	η_4	η_5
68%	66%	88%	66%	68%



Дано:

$$T = 300 \text{ K}$$

$$\Delta T = 2 \text{ K}$$

$$\frac{\Delta \eta}{\eta} = ?$$

Решение:

$$p \cdot V = \eta \cdot R \cdot T$$

$$\eta = \frac{p \cdot V}{R \cdot T}$$

$$\frac{\Delta \eta}{\eta} = \sqrt{\left(\frac{\Delta p}{p}\right)^2 + \left(\frac{\Delta V}{V}\right)^2 + \left(\frac{\Delta T}{T}\right)^2}$$

	p	Δp	V	ΔV
1	$2 \cdot 10^5$	$5 \cdot 10^3$	$4 \cdot 10^{-3}$	$0,1 \cdot 10^{-3}$
2	$1 \cdot 10^5$	$5 \cdot 10^3$	$8 \cdot 10^{-3}$	$0,1 \cdot 10^{-3}$

$$\eta_1 = \frac{p_1 \cdot V_1}{R \cdot T} = \frac{(2 \cdot 10^5) \cdot (4 \cdot 10^{-3})}{8,314 \cdot 300}$$

$$\approx 0,32 \text{ моль}$$

$$\eta_2 = \frac{p_2 \cdot V_2}{R \cdot T} = \frac{(1 \cdot 10^5) \cdot (8 \cdot 10^{-3})}{8,314 \cdot 300} \approx 0,32 \text{ моль}$$

$$\eta_{\text{ср}} = \frac{0,32 + 0,32}{2} = 0,32 \text{ моль}$$

$$\text{относительно } \eta_1 \text{ и } \eta_2 \text{ } \frac{\Delta p}{p} = \frac{5 \cdot 10^3}{2 \cdot 10^5} = 0,025$$

$$\frac{\Delta V}{V} = \frac{0,1 \cdot 10^{-3}}{4 \cdot 10^{-3}} = 0,025$$

$$\frac{\Delta T}{T} = \frac{2}{300} = 0,0067$$

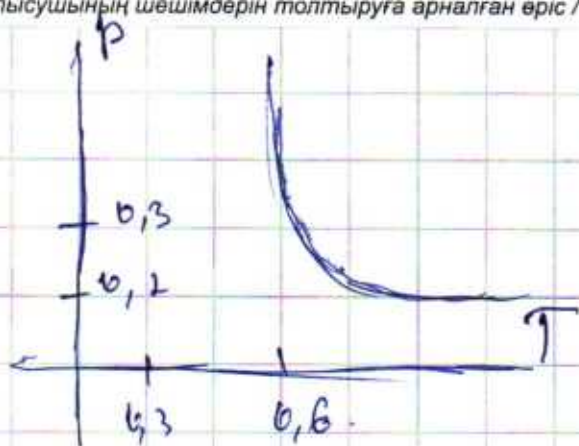
Вычисление относительной погрешности

$$\frac{\Delta \eta}{\eta} = \sqrt{\left(\frac{\Delta p}{p}\right)^2 + \left(\frac{\Delta V}{V}\right)^2 + \left(\frac{\Delta T}{T}\right)^2} = \sqrt{(0,025)^2 + (0,025)^2 + (0,0067)^2} = 0,036$$

Вычисление абсолютной погрешности

$$\Delta \eta = \eta_{\text{ср}} \cdot \frac{\Delta \eta}{\eta} = 0,32 \cdot 0,036 \approx 0,012 \text{ моль}$$

$$\eta = 0,32 \pm 0,012 \text{ моль}$$



Б.1. Бер.

$$M: n = 300 \pm 2k = 298 \text{ to } 302$$

$$T = 300 \pm 2k$$

$$R = 8,314 \text{ Дж}$$

$$n = \frac{8,314}{300 \pm 2k} = 0,01$$

$$T/k: n = ?$$

$$\Delta n = ?$$

$$p = 100$$

$$V = 10 \text{ м}$$

300

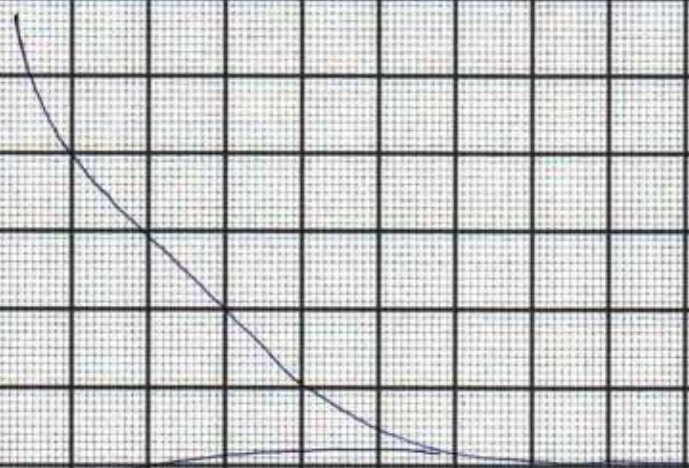
$P, \text{ кПа}$

200

$V, \text{ м}$

100

0



Бер: 30.

25H

Шеші:

$$t = 300 + 2k$$

30K2

$$n = 600 - 8,34 = 591,66$$

$$m = 8,34 \text{ g}$$

$$591,66 : 30 = 19,722$$

$$3209,22 - 300 = 2909,22$$

$$n = ?$$

$$30 - 8 = 22$$

$$8 \cdot 30 = 240 - 300$$

$$3284 + 22 + 300 = 3906$$

$$591,66 - 3608 = 230,66$$

$$\text{Аяқабат: } n = 2909,22$$

Бұдан:



$$P = 100$$

$$k = 0.25$$

$$T = 500 \pm 0.5$$

$$R = 5.34 \text{ Pa}$$

$$R = 5$$

$$R = 5$$

$$P_{\text{max}} = 100$$

x

$$0.1 \cdot 0.5 = 0.05$$

x

$$0.3 \cdot 0.5 = 0.15$$

x

$$0.4 \cdot 0.5 = 0.2$$

x

$$0.1 \cdot 0.5 = 0.05$$

x

$$0.6 \cdot 0.5 = 0.3$$

x

$$0.8 \cdot 0.5 = 0.4$$

x

$$0.5 \cdot 0.4 = 0.2$$

x

$$0.1 \cdot 100 = 10 \text{ Pa}$$

x

$$100 \cdot 0.5 = 50 \text{ Pa}$$

x

$$100 \cdot 0.5 = 50 \text{ Pa}$$

x

$$100 \cdot 0.5 = 50 \text{ Pa}$$

x

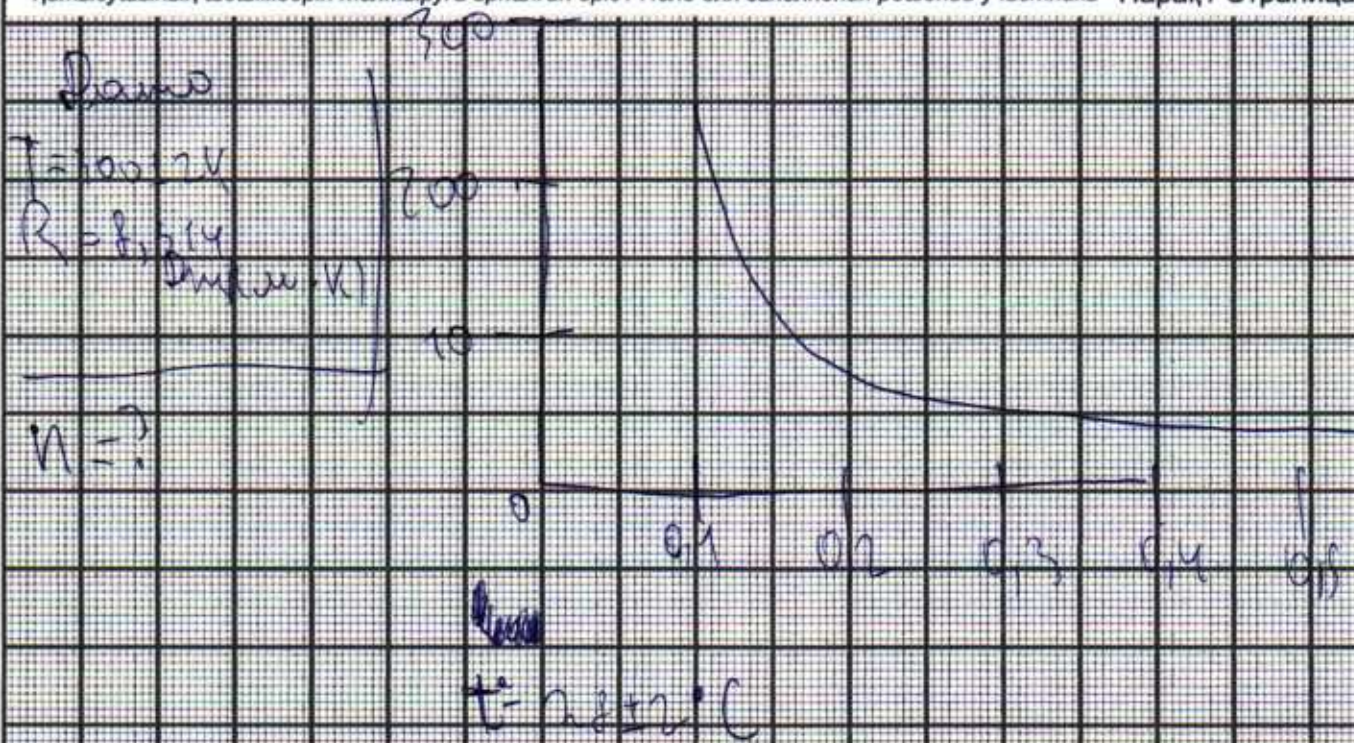
$$100 \cdot 0.5 = 50 \text{ Pa}$$

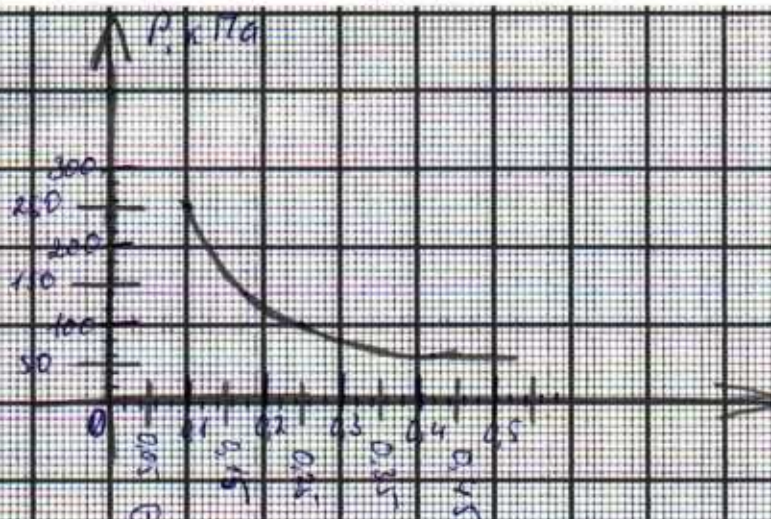
x

$$100 \cdot 0.5 = 50 \text{ Pa}$$

x

$$100 \cdot 0.5 = 50 \text{ Pa}$$





Дано

$$T = 300 + 2 \text{ К}$$

P кПа (значения в таблице)

V м (значения в таблице)

$$P = 8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{К}}$$

Найти: n ; Δn

Найдём доопределённое значение V

$$\frac{0.1 + 0.2}{2} = 0.15 \text{ м}$$

$$\frac{0 + 0.1}{2} = 0.05 \text{ м}$$

$$\frac{0.2 + 0.3}{2} = 0.25 \text{ м}$$

$$\frac{0.3 + 0.4}{2} = 0.35 \text{ м}$$

$$\frac{0.4 + 0.5}{2} = 0.45 \text{ м}$$

Найдём значение периода T

$$\frac{0.1 - 0}{5} = 0.02 \text{ м}$$

$$\frac{0.2 - 0.1}{5} = 0.02 \text{ м}$$

$$\frac{0.3 - 0.2}{5} = 0.02 \text{ м}$$

$$\frac{0.4 - 0.3}{5} = 0.02 \text{ м}$$

$$\frac{0.5 - 0.4}{5} = 0.02 \text{ м}$$

Найдём доопределённое значение P

$$\frac{0 + 100}{2} = 50 \text{ кПа} = 50000 \text{ Па}$$

$$\frac{100 + 200}{2} = 150 \text{ кПа} = 150000 \text{ Па}$$

$$\frac{200 + 300}{2} = 250 \text{ кПа} = 250000 \text{ Па}$$

Найдём значение периода P

$$\frac{100 - 0}{5} = 20 \text{ кПа} = 20000 \text{ Па}$$

$$\frac{200 - 100}{5} = 20 \text{ кПа} = 20000 \text{ Па}$$

$$\frac{300 - 100}{5} = 20 \text{ кПа} = 20000 \text{ Па}$$

$$p \cdot V = \frac{m}{M} \cdot R \cdot T$$

30 p мәнімен бізге иі уақыты

$$p = 100 \text{ кПа} = 100\,000 \text{ Па}$$

30 V берімен уақыты иі уақыты

$$V = 0,25 \text{ м}^3$$

$$100\,000 \cdot 0,25 = 25\,000 \text{ мПа}$$

показывающ уақыты

$$25000 = \frac{m}{M} \cdot 8,314 \frac{\text{Дж}}{\text{моль} \cdot \text{К}} = 300 \cdot 25$$

$$25000 \text{ мПа} = \frac{m}{M} \cdot 2494,2$$

$$p = 250\,000 \text{ Па} \quad V = 0,1 \text{ м}^3$$

$$p = 100 + 20 + 20 + 20 = 180 \text{ кПа} = 180\,000 \text{ Па}; \quad V = 0,1 + 0,02 + 0,02 = 0,14 \text{ м}^3$$

$$p \cdot V =$$

$$250\,000 \cdot 0,1 = 25\,000 \text{ мПа}$$

$$180\,000 \cdot 0,14 = 25\,200 \text{ мПа}$$

$$\Delta p = \frac{25\,000 + 25\,000 + 25\,200}{2} = \frac{75\,200}{2} = 37\,600 \text{ мПа}$$

$$\text{Сөйет. } p = 25\,000 \text{ мПа}, \Delta p = 37\,600 \text{ мПа}$$