№1

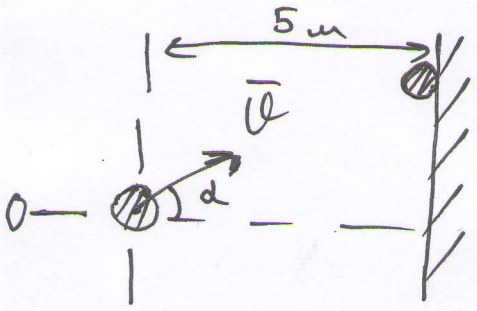
$L = 5\text{м}$

$v = 10\ \frac{\text{м}}{\text{с}}$

$\alpha = 45^\circ$

$c = 2{,}5 \cdot 10^3\ \frac{\text{Дж}}{\text{кг} \cdot {}^\circ\text{C}}$

$\Delta t - ?$



$E_к = \frac{m v^2}{2}$

$Q = c \cdot m \cdot \Delta t$

$E_к = Q$

$c \cdot m \cdot \Delta t = \frac{m v^2}{2}$

$\Downarrow$

$\Delta t = \frac{v^2}{2 \cdot c} = \frac{10^2}{2 \cdot 2{,}5 \cdot 10^3} =$

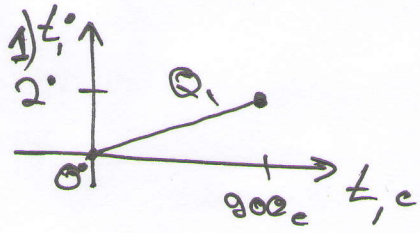
$= \frac{100}{5000} = 0{,}02\ ^\circ\text{C}$

Ответ: $0{,}02\ ^\circ\text{C}$

№2

$m_1 = 0,1$ кг
$t_1 = 0°C$
$\tau_1 = 900$ с
$m_2 = 0,1$ кг
$t_2 = 2°C$
$\tau_2 = 36000$ с
$c = 4200 \frac{Дж}{кг \cdot °C}$

$\lambda - ?$

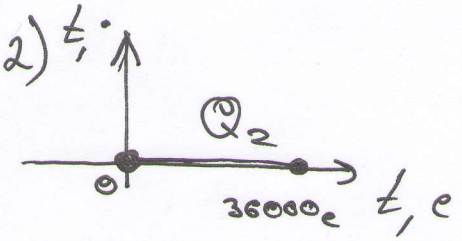
1) 

$Q_1 = c \cdot m_1 \cdot \Delta t$

$Q_1 = 4200 \cdot 0,1 \cdot (2-0) =$

$= 840$ Дж

$\frac{\tau_2}{\tau_1} = 40$

2) 

$Q_2 = 40 Q_1 = 840 \cdot 40 = 336 \cdot 10^3$

$Q_2 = \lambda \cdot m$

$\lambda = \frac{Q_2}{m} = \frac{336 \cdot 10^3}{0,1} =$

$= 336 \cdot 10^3 \frac{Дж}{кг}$

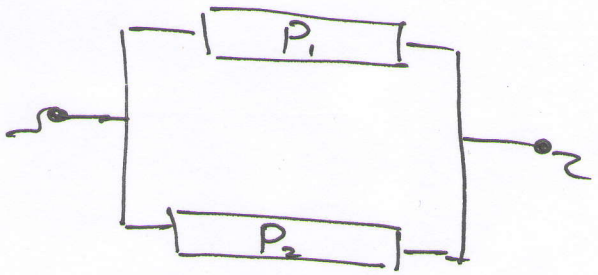
Ответ: $336 \cdot 10^3 \frac{Дж}{кг}$

№3

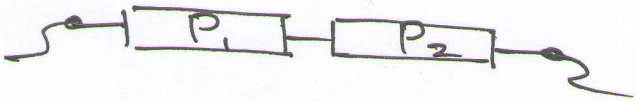
$P_1 = 100$ Вт
$P_2 = 200$ Вт

$\frac{P_{o2}}{P_{o1}} - ?$

1)



2)



$$P_{o1} = \frac{P_1 \cdot P_2}{P_1 + P_2} \; ; \quad P_{o2} = P_1 + P_2 \; ;$$

$$\frac{P_{o2}}{P_{o1}} = \frac{P_1 + P_2}{\frac{P_1 \cdot P_2}{P_1 + P_2}} = \frac{2P_1 + 2P_2}{P_1 \cdot P_2} =$$

$$= \frac{2 \cdot 100 + 2 \cdot 200}{100 \cdot 200} = \frac{200 + 400}{20000} =$$

$$= \frac{6}{200} = 0{,}03$$

Ответ: 0,03

№4

$\mu_1 = 0{,}07 \frac{л}{км} = 0{,}00007 \frac{м^3}{км}$

$m_1 = 1000$ кг

$\eta = 30\% = 0{,}3$

$q = 42 \cdot 10^9 \frac{Дж}{кг}$

$\rho = 0{,}7 \frac{кг}{л}$

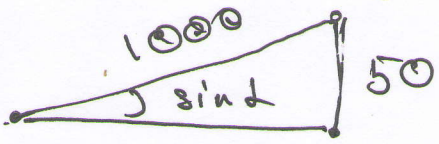
$L = 1000$ м

$h = 50$ м

$\mu_2 - ?$

$\mu = \frac{V}{S} = \frac{V}{L}$;

$\eta = \frac{A}{Q}$



$A = F \cdot L \cdot \sin\alpha$

$\sin\alpha = \frac{50}{1000} = 0{,}05$

$A = 1000 \cdot 0{,}05 \cdot 1000 =$

$= 50000$ Дж ; $m = \rho \cdot V$

$Q = q \cdot m = q \cdot \rho \cdot V$

$\eta = \frac{A}{q \cdot \rho \cdot V} \Rightarrow V = \frac{A}{q \cdot \rho \cdot \eta} = \frac{50000}{42 \cdot 10^9 \cdot 700 \cdot 0{,}3} =$

$= \frac{50000}{8820 \cdot 10^5} = \frac{5{,}6 \cdot 10^{-5}}{10^6} = \frac{56}{108}$

$\mu_2 = \frac{5{,}6 \cdot 10^{-5}}{1000} =$

$\mu_2 = \frac{56}{10^8} = \frac{56000}{1000000000} = 0{,}000056 \frac{м^3}{км} = 0{,}56 \frac{л}{км}$

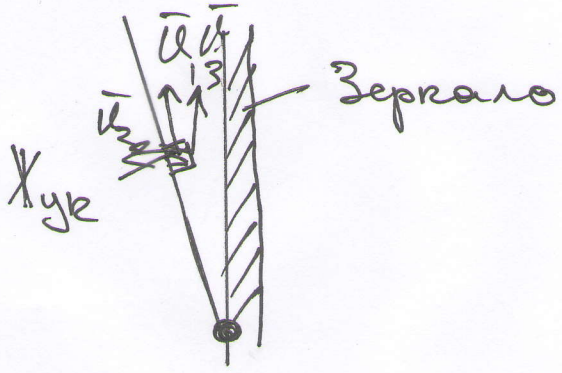
Ответ: $0.56 \frac{л}{км}$

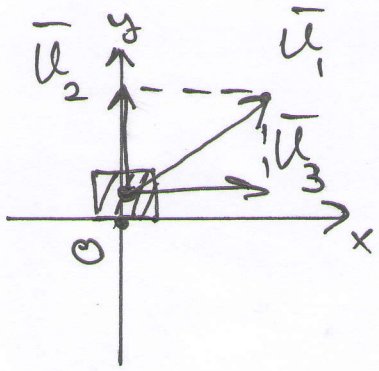
№5

$v_1 = 3 \frac{см}{с} = 0{,}03 \frac{м}{с}$

$v_2 = 2 \frac{см}{с} = 0{,}02 \frac{м}{с}$

$|v_3| - ?$





$\bar{v}_2 + \bar{v}_3 = \bar{v}_1 \Rightarrow \bar{v}_3 = \bar{v}_1 - \bar{v}_2 =$

$= 0{,}03 - 0{,}02 = 0{,}01 \frac{м}{с}$

Ответ: $0{,}01 \frac{м}{с}$