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II

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H.  $\frac{m}{h} V_0$  . -  
 ,  
 ,  
 ?  
 t<sub>0</sub>.

$$m v_0 = M u + m v_1 \quad (1)$$

$$M u^2 / 2 = M g H \quad u = \sqrt{2 g H} \quad (2)$$

(2) (1),

$$m v_0 = M \sqrt{2 g H} + m v_1$$

$$v_1 = v_0 - \frac{M}{m} \sqrt{2 g H}$$

$$h = \frac{v_1^2}{2g} \quad h = \frac{\left( v_0 - \frac{M}{m} \sqrt{2gH} \right)^2}{2g}$$

$$Q = m v_0^2 / 2 - m v_1^2 / 2 - M g H$$

$$c m \Delta t = Q / 2 \quad \Delta t = Q / 2 c m$$

$$t = t_0 + \Delta t \quad t = t_0 + \frac{m v_0^2 - m \left( v_0 - \frac{M}{m} \sqrt{2 g H} \right)^2 - 2 M g H}{4 c m}$$

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2

U-

2H.

h

$$\Delta h$$

$$\Delta p = \rho g 2 \Delta h$$

$$F = \rho g 2 \Delta h S$$

$$F = -k \Delta h \quad k = 2\rho g S$$

$$T = 2f \sqrt{\frac{m}{k}}$$

$m$

$$m = \dots V = \dots S \cdot 2H$$

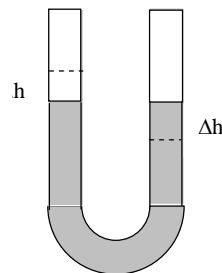
$$T = 2f \sqrt{\frac{2 \dots SH}{2 \dots gS}} = 2f \sqrt{\frac{H}{g}}$$

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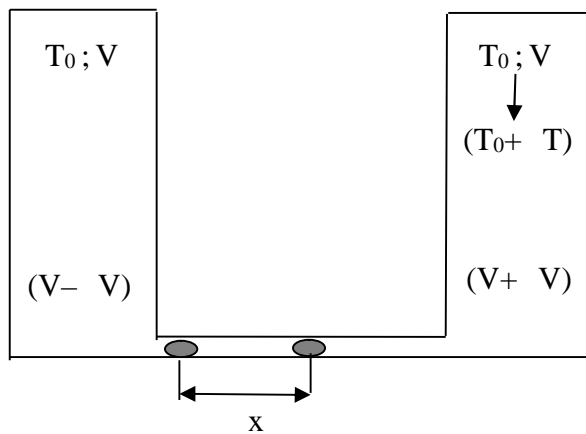
3



$T/T_0$

$x,$

$S.$



$$T_1 = T_0 + \Delta T$$

$\Delta x.$

$$V + \Delta V, \quad V - \Delta V.$$

$$p_1 (V + \Delta V) = R (T_0 + \Delta T) m / \mu$$

$$p_2 (V - \Delta V) = R T_0 m / \mu$$

$$, \quad , \quad p_1 = p_2 ,$$

$$\frac{mR(T_0 + \Delta T)}{\sim(V + \Delta V)} = \frac{mRT_0}{\sim(V - \Delta V)}$$

$$, \quad \Delta V = S \Delta x, \quad :$$

$$(T_0 + \Delta T)(V - S\Delta x) = T_0(V + S\Delta x)$$

$$\frac{\Delta T}{T_0} = \frac{V + S\Delta x}{V - S\Delta x} - 1$$

$$S \Delta x \ll V,$$

$$\frac{\Delta T}{T_0} = \frac{2S\Delta x}{V}$$

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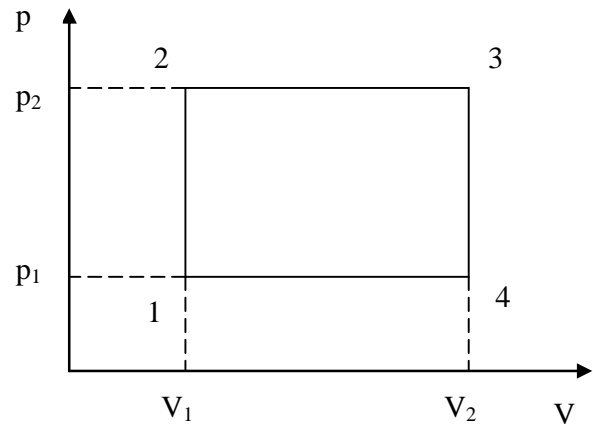
p V. pV- -

1-2 2-3,  
3-4 4-1 ( . ).

1-2 2-3

$$Q_{12} = \frac{3}{2} \epsilon R(T_2 - T_1) = \frac{3}{2} V_1 (p_2 - p_1)$$

$$Q_{23} = \frac{5}{2} \epsilon R(T_3 - T_2) = \frac{5}{2} p_2 (V_2 - V_1)$$



$$A = (p_2 - p_1)(V_2 - V_1)$$

$$y = \frac{A}{Q_{12} + Q_{23}} = \frac{(p_2 - p_1)(V_2 - V_1)}{\frac{3}{2} V_1 (p_2 - p_1) + \frac{5}{2} p_2 (V_2 - V_1)}$$

$$\Delta p = (p_2 - p_1) \quad \Delta V = (V_2 - V_1), \quad p_2 = p_1 + \Delta p,$$

$$\frac{1}{y},$$

$$\frac{1}{y} = \frac{3/2 \Delta p V_1 + 5/2 (\Delta V p_1 + \Delta p \Delta V)}{\Delta p \Delta V} = \frac{5}{2} + \frac{3V_1}{2\Delta V} + \frac{5p_1}{2\Delta p}$$

$$\Delta p \gg p_1 \quad \Delta V \gg V_1,$$

$$y_{\max} = 0.4$$

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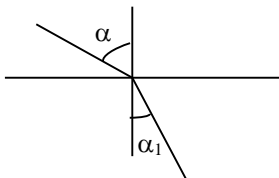
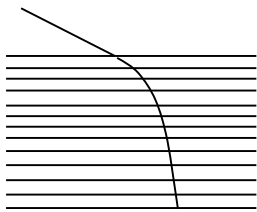
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$n_0$

$n_k$

d.



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$$\frac{\sin \Gamma_0}{\sin \Gamma_1} = \frac{n_1}{n_0}$$

$$n_0 \sin \alpha = n_1 \sin \alpha_1$$

$$n_i \sin \alpha_i = \text{const} = n_0 \sin \alpha \quad (1)$$

$$n \sin \beta = n_0 \sin \alpha$$

$$\sin S = \frac{n \sin \Gamma_0}{n_k}$$

$$\beta = \text{arc sin} (n_0 \sin \alpha / n)$$

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(1).