

(10)

1 (10)

(2,8 / )

$$L = (2,8 / + v)t \quad (1)$$

$$L - 720 = L/(2,8 / - v) \quad (2)$$

$$L - 180 = L/(2,8 /) \quad (3)$$

$$L = (2,8 / + v)t \quad (1)$$

$$vt = 504 \quad (1)$$

$$v = 1,4 /c \quad (2)$$

2 (10)

$l$

$$\sqrt{a^2 + (H-h)^2}$$

$$\sqrt{a^2 + h^2}$$

$$a \quad (1)$$

(1)

)

$a$   
:

$$\sqrt{a^2 + h^2} \quad (1)$$

$$H = \frac{v_0^2}{2g} \quad (1)$$

:

$$t_0 = \frac{2v_0}{g} \quad (1)$$

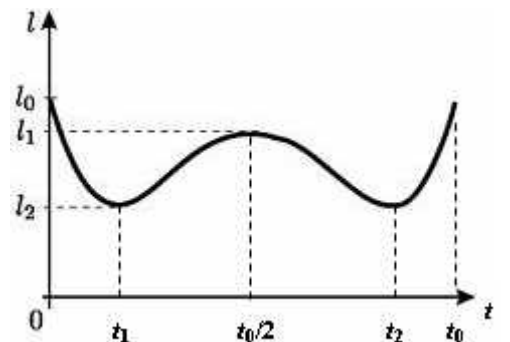
$$t_1 = \frac{v_0 - \sqrt{v_0^2 - 2gh}}{g}; t_2 = \frac{v_0 + \sqrt{v_0^2 - 2gh}}{g} \quad (2)$$

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$$l_0 = \sqrt{a^2 + h^2}; l_1 = \sqrt{a^2 + \left(\frac{v_0^2}{2g} - h\right)^2}; l_2 = a \quad (3)$$

(3)

$h$ :



$Q_+ = 1 - Q_- / Q_+$ ,  $Q_- = 20\% = 1/5$ ,  $Q_+ = (5/4) \cdot Q_-$ . (1)

$1-2: (A_{12} > 0) \quad (U_{12} > 0), \quad Q_{12} > 0, \dots$

$2-3: \quad Q_{23} = 0, \dots$

$3-1: (U_{31} = 0), \quad (A_{31} < 0), \quad Q_{31} < 0,$

$\dots$

$$Q_+ = Q_{12} = (5/4) \cdot A. \quad (2)$$

$$T_{\max} - T_{\min} = pV_{3-1} - pV_{1-2} = T_{\max} - T_{\min}. \quad (1)$$

$$Q_{12} = U_{12} + A_{12}. \quad (1)$$

$$U_{12} = (3/2) \cdot R \cdot T. \quad (1)$$

$$A_{12} = (1/2) \cdot (p_1 + p_2)(V_2 - V_1) = (1/2) \cdot (p_1 V_2 + p_2 V_2 - p_1 V_1 - p_2 V_1). \quad (1)$$

$$p_2/V_2 = p_1/V_1 \rightarrow p_2 V_1 = p_1 V_2 \rightarrow A_{12} = (1/2) \cdot (p_2 V_2 - p_1 V_1). \quad (1)$$

$$p_1 V_1 = RT_{\min} \quad p_2 V_2 = RT_{\max}. \quad (1)$$

$$A_{12} = (1/2) \cdot R(T_{\max} - T_{\min}) = (1/2) \cdot R \cdot T.$$

$$Q_{12} = (3/2) \cdot R \cdot T + (1/2) \cdot R \cdot T = 2 R \cdot T.$$

$$Q_{12} = (5/4) \cdot A,$$

$$T = (5/8) \cdot A / (R \cdot 60). \quad (1)$$

**4 (10)**

$$R_A = \frac{U_1}{I_1} \approx 66,7 \quad (2)$$

$$R_V = \frac{U_2}{I_2} = 10^3 \text{ ( )}. \text{ (2 )}$$

$$U = U_2 + I_2 R_A = 2,77 \text{ ( )}. \text{ (1 )}$$

$$I_{V_1} = \frac{U_1}{R_V} = 0,4 \text{ ( )}. \text{ (1 )}$$

$$I_{V_1} + I_1 = I + I_2,$$

$$I = I_{V_1} + I_1 - I_2 = 3,8 \text{ ( )}. \text{ (2 )}$$

$$R = \frac{U}{I} \approx 729 \text{ ( )}. \text{ (2 )}$$

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