

2)

 $i=3$

$$p \sim V$$

$$\Rightarrow 4p = k \cdot 4V$$

$$p = kV$$

$$A_{\text{мех}} = \int p \, dV = (4p - p) \cdot (4V - V) \cdot \frac{1}{2}$$

$$= 3p \cdot 3V \cdot \frac{1}{2} = 4,5 pV$$

$$\eta = \frac{A_{\text{мех}}}{Q}$$

Q - тепло, получаемое
в процессе 3-1

$$Q_{31} = A_{31} + \Delta U_{31}$$

$$4p \cdot 4V = \gamma R T_1$$

$$\Delta U_{31} = \frac{3}{2} \gamma R (T_1 - T_3) = \frac{3}{2} (16pV - pV) = \frac{3 \cdot 15pV}{2} = 22,5 pV$$

$$p \cdot 4V = \gamma R T_2$$

$$pV = \gamma R T_3$$

$$A_{31} = \frac{p+4p}{2} \cdot (4V - V) = 2,5p \cdot 3V = 7,5 pV$$

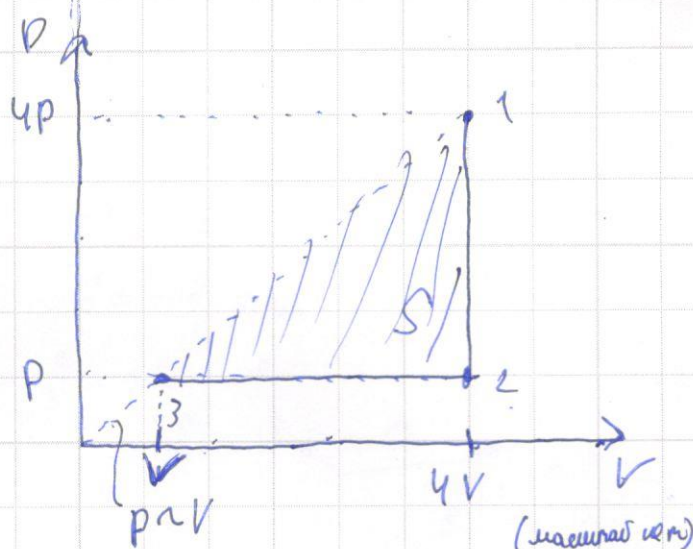
$$Q_{31} = 30 pV$$

$$\eta = \frac{4,5 pV}{30 pV} = 0,15 = 15\%$$

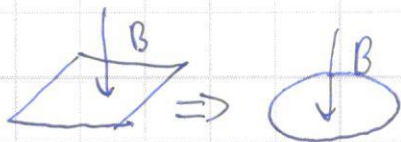
Ответ: 15%

15%

$$Q_{31} > 0 \quad Q_{12}, Q_{23} < 0$$



3)

 $a = 3 \text{ м}$ $b = 1 \text{ тл}$ $R = 1 \text{ Ом}$ $q = ?$ 

$$\mathcal{E} = -\frac{d\Phi}{dt}$$

$$\Phi = B \cdot S$$

$$-\frac{d\Phi}{dt} = -B \frac{dS}{dt}$$

$$-B \frac{dS}{dt}$$

$$\mathcal{E} = -\frac{d\Phi}{dt} \quad |\mathcal{E}| = \frac{d\Phi}{dt}$$

$$\omega = \omega_a = \omega_{\text{мех}} = 2\pi \nu$$

$$\nu = \frac{\omega_a}{2\pi} = \frac{2\pi}{2\pi} = 1$$

$$S_0 = a^2 \quad S = \pi a^2$$

$$S = \pi \left(\frac{2a}{\pi} \right)^2 = \frac{4a^2}{\pi}$$

$$\frac{d\Phi}{dt} = \mathcal{I}(t) \cdot R \quad B \frac{dS}{dt} = \mathcal{I}(t) \cdot R$$

$$\int B \cdot dS = \int R \cdot \mathcal{I}(t) \cdot dt$$

$$B \Delta S = qR \quad q = \frac{B \Delta S}{R}$$

$$q = \frac{B \Delta S}{R}$$

$$\Delta S = \frac{4a^2}{\pi} - a^2$$

$$S > S_0$$

$$\Delta S = a^2 \left(\frac{4}{\pi} - 1 \right)$$

$$\text{Ответ: } q = 2,45 \text{ мкн}$$

Парақтың артқы жағын толтырмаңыз / Обратную сторону листа не заполнять

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
БІЛІМ ЖӘНЕ ҒЫЛЫМ МИНИСТРЛІГІ
"ДАРЫН" РЕСПУБЛИКАЛЫҚ ҒЫЛЫМИ-ПРАКТИКАЛЫҚ ОРТАЛЫҒЫ
РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК ҚАЗЫНАЛЫҚ КӘСІПОРНЫ

$$a) g_2 = 9,48 \text{ м/с}^2$$

$$g_n = 9,83 \text{ м/с}^2$$

$$T_2 = 2\pi \sqrt{\frac{l}{g_2}}$$

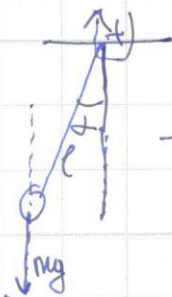
$$T_n = 2\pi \sqrt{\frac{l}{g_n}}$$

$$T_{\text{сум}} = 24 \text{ с}$$

$$T_{\text{сум}} = T_2 \cdot N_2 = T_n \cdot N_n$$

$$\frac{N_n}{N_2} = \frac{T_{\text{сум}}}{T_2} \cdot \frac{T_2}{T_n} = \frac{T_2}{T_n} = \frac{2\pi \sqrt{\frac{l}{g_2}}}{2\pi \sqrt{\frac{l}{g_n}}} = \sqrt{\frac{g_n}{g_2}} = 1.0025$$

маятник



$$M = I \cdot \epsilon \quad I = ml^2$$

$$-mgl \sin \alpha = ml^2 \epsilon$$

$$-g \sin \alpha = l \epsilon$$

$$\epsilon = -\frac{g}{l} \sin \alpha$$

sin alpha approx alpha

$$\epsilon \approx -\frac{g}{l} \alpha$$

$$\epsilon + \frac{g}{l} \alpha = 0$$

$$l \ddot{\alpha} + \frac{g}{l} \alpha = 0$$

$$\omega^2 = \frac{g}{l}$$

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

Омбер
1.0025 раз

0.25%

или 0.25%

энергии

1)

$$\alpha = 30^\circ$$

$$v_1 = 24 \text{ м/с}$$

$$v_2 = 32 \text{ м/с}$$

$$\beta = 60^\circ$$

$$t = 1.5 \text{ с}$$

L = ?

$$x_1(t) = v_1 \cos \alpha \cdot t$$

$$x_2(t) = v_2 \cos \beta \cdot t$$

$$y(t) = v_1 \sin \alpha \cdot t - \frac{gt^2}{2}$$

$$y(t) = v_2 \sin \beta \cdot t - \frac{gt^2}{2}$$

$$y_1 - y_2 = (v_1 \sin \alpha - v_2 \sin \beta) \cdot t$$

$$x_1 + x_2 = (v_1 \cos \alpha + v_2 \cos \beta) \cdot t$$

$$y_1 - y_2 = (24 \cdot \sin 30 - 32 \cdot \sin 60) \cdot 1.5 = 23.569$$

$$x_1 + x_2 = (24 \cdot \cos 30 + 32 \cdot \cos 60) \cdot 1.5 = 55.1769$$

$$L(t) = t \sqrt{v_1^2 + v_2^2}$$

$$L(t) = t \sqrt{(v_1 \sin \alpha - v_2 \sin \beta)^2 + (v_1 \cos \alpha + v_2 \cos \beta)^2} = t \sqrt{v_1^2 \sin^2 \alpha - 2v_1 v_2 \sin \alpha \sin \beta + v_2^2 \sin^2 \beta + v_1^2 \cos^2 \alpha + 2v_1 v_2 \cos \alpha \cos \beta + v_2^2 \cos^2 \beta}$$

$$= t \sqrt{v_1^2 + v_2^2 + 2v_1 v_2 (\cos \alpha \cos \beta - \sin \alpha \sin \beta)}$$

$$= t \sqrt{v_1^2 + v_2^2}$$

$$\text{расстояние } L(t) = \sqrt{v_1^2 + v_2^2} \cdot t$$

$$L(1.5) = 40 \cdot 1.5 = 60 \text{ м}$$

Омбер: 60 м

