

Бланк ответов

10 класс

Шифр

305

ФА1-10

№1
Дано:
 $t = 4 \text{ c}$
 $S = 11 \text{ м}$
 $t_1 = 2 \text{ c}$
 $v_0 = ?$
 $v_{02} = 3 \text{ м/с}$
 $v_{03} = 3 \text{ м/с}$
 $a_{13} = 0 \text{ м/с}^2$
 $v_{12} = 3 \text{ м/с}$
 $v_{11} = 3 \text{ м/с}$
 $t_2 = 1 \text{ c}$
 $t_3 = 1 \text{ c}$
 $t_4 = 2 \text{ c}$

Решение:

$$a_3 = \frac{v - v_0}{t} = \frac{-3}{1} = -3 \left(\frac{\text{м}}{\text{с}^2} \right)$$

$$S_3 = v_{03} t_3 + \frac{a_3 t_3^2}{2} = 3 \cdot 1 - \frac{3 \cdot 1^2}{2} = 1,5 \text{ (м)}$$

$$S_2 = v_2 \cdot t_2 = 3 \cdot 1 = 3 \text{ (м)}$$

$$S_1 = S - (S_2 + S_3) = 11 - 4,5 = 6,5 \text{ (м)}$$

$$a_1 = \frac{v_1 - v_{01}}{t_1} = \frac{3,5 - v_{01}}{t_1} = \frac{3,5 - v_{01}}{2}$$

~~$a_1 = a_3$~~

~~$\frac{3,5 - v_{01}}{2} = \frac{2S_1 - 2v_{01}t_1}{t_1^2}$~~

~~$\frac{3,5 - v_{01}}{2} = \frac{2 \cdot 6,5 - 2v_{01} \cdot 2}{4}$~~

$$\frac{3,5 - v_{01}}{2} = \frac{2S_1 - 2v_{01}t_1}{t_1^2}$$

$$\frac{3,5 - v_{01}}{2} = \frac{13 - 4v_{01}}{4} \quad | \cdot 4$$

$$7 - 2v_{01} = 13 - 4v_{01}$$

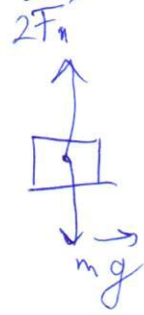
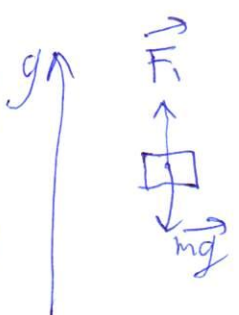
$$-2v_{01} = -6$$

$$v_{01} = 3,5 \text{ (м/с)} \quad \text{Ответ: } 3,5 \text{ м/с}$$

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№ 2
 Dano: $F_2 = 2F_1$
 $a_1 = 8 \text{ m/s}^2$
 $a_2 = 3a_1$

$g = ?$



$$F_1 - mg = ma_1$$

$$g = \frac{ma_1 - F_1}{-m}$$

~~$$F_1 - mg = 2F_1 - mg$$~~

~~$$3F_1 - 3mg = 2F_1 - mg$$~~

~~$$F_1 = 2mg$$~~

$$2F_1 - mg = 3ma_2$$

$$ma_2 = \frac{2F_1 - mg}{3}$$

$$g = \frac{3ma_2 - 2F_1}{-m}$$

$$g = g$$

$$\frac{ma_1 - F_1}{-m} = \frac{3ma_2 - 2F_1}{-m} \quad | \cdot (-m)$$

$$ma_1 - F_1 = 3ma_2 - 2F_1$$

$$F_1 = 2ma_1$$

$$F_1 = 16m$$

~~$$16m - 16m = mg$$~~

$$g = \frac{m a_1 - 16m}{-m} = \frac{m(-8)}{-m} = 8 \text{ (m/s}^2\text{)}$$

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№ 3
 Dano: $M_k = 0,9 \text{ kg}$
 $h_k = 0,18 \text{ m}$
 $m_{cu} = 0,1 \text{ kg}$
 $v_k = ?$

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0,9

Закон сохранения мех. энергии

$$m_{cu} g h_k = \frac{m_{cu} v_{cu}^2}{2} + \frac{M_k v_k^2}{2}$$

~~$$v_k = \sqrt{2mgh - m v_{cu}^2}$$~~

~~$$mgh = \frac{m v_{cu}^2}{2} + \frac{M_k v_k^2}{2}$$~~

~~$$2mgh = m v_{cu}^2 + M_k v_k^2$$~~

~~$$2mgh \cdot m^2 = v_k^2 (m^2 M_k + M_k^2)$$~~

~~$$v_k = \sqrt{\frac{2mgh \cdot m^2}{m^2 M_k + M_k^2}} = \sqrt{\frac{2mgh \cdot m}{m + M_k}}$$~~

Ответ: 8 m/s^2

$$\Rightarrow v_{cu} = \frac{M_k v_k}{m} = \dots$$

$$2mgh = m v_{cu}^2 + M_k v_k^2$$

~~$$2mgh - m \left(\frac{M_k v_k}{m}\right)^2 = M_k v_k^2$$~~

~~$$v_k = \sqrt{\frac{36}{99}} = \sqrt{\frac{4}{11}}$$~~

~~$$v_k = 2 \left(\frac{m}{s}\right)$$~~

~~$$v_k = \dots$$~~

Ответ: 2 m/s