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فضل ٣

$$a = 4 \text{ m/s}^2, \quad t = 2 \text{ s}, \quad \Delta x = 10 \text{ m}, \quad v_0 = ?$$

$$\Delta x = \frac{1}{2} a t^2 + v_0 t \rightarrow 10 = \frac{1}{2} (4) (2)^2 + v_0 (2) \rightarrow v_0 = 4 \text{ m/s}$$

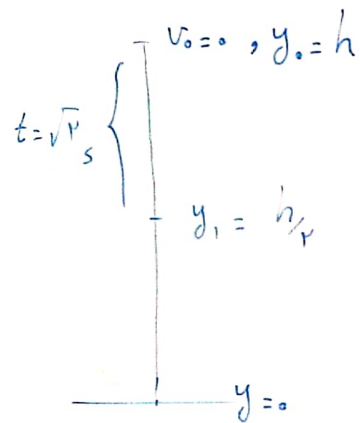
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فضل ٣

$$y_0 = h = ?, \quad v_0 = 4 \text{ m/s}, \quad t = 2 \text{ s}, \quad y = 20 \text{ m}, \quad g = 10 \text{ m/s}^2$$

$$y - y_0 = -\frac{1}{2} g t^2 + v_0 t \rightarrow 20 - h = -\frac{1}{2} (10) (2)^2 + 4 (2) \rightarrow h = 20 \text{ m}$$

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فصل ۳

$$y_0 = h = ? , \quad v_0 = 0 , \quad t = \sqrt{2} \text{ s} , \quad v = 0 \text{ بر روی زمین } y = 0$$



$$y_1 - y_0 = -\frac{1}{2} g t^2 + v_0 t \rightarrow \frac{h}{2} - h = -\frac{1}{2} (10) (\sqrt{2})^2 + 0 \rightarrow h = 2.0 \text{ m}$$

$$v^2 - v_0^2 = -2g(y - y_0) \rightarrow v^2 - 0 = -2(10)(0 - 2.0) \rightarrow v^2 = 40.0$$

$$v = -2.0 \text{ m/s}$$

که بخاطر جهت حرکت (منفی به نشانه)

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۳ فصل

$$y_0 = h = ? , v_0 = 0 , t = 4s , y = 0 , \text{مسافت } \frac{h}{9} \rightarrow t_1 = ?$$

$$\begin{array}{l} v_0 = 0 \\ y_0 = h \\ y_1 = \frac{1}{9}h \end{array} \left. \vphantom{\begin{array}{l} v_0 = 0 \\ y_0 = h \\ y_1 = \frac{1}{9}h \end{array}} \right\} \frac{h}{9}$$

$$y - y_0 = -\frac{1}{2}gt^2 + v_0t \rightarrow 0 - h = -\frac{1}{2}(10)(4)^2 + 0 \rightarrow h = 110 \text{ m}$$

$$\text{مسافت } \frac{h}{9} \text{ یس: } y_1 - y_0 = -\frac{1}{2}gt_1^2 + v_0t_1 \rightarrow -\frac{h}{9} = -\frac{1}{2}gt_1^2 + v_0t_1$$

$$-110 = -\frac{1}{2}(10)t_1^2 + 0 \rightarrow t_1^2 = 22 \rightarrow t = 4.69 \text{ s}$$

$$y = 0$$

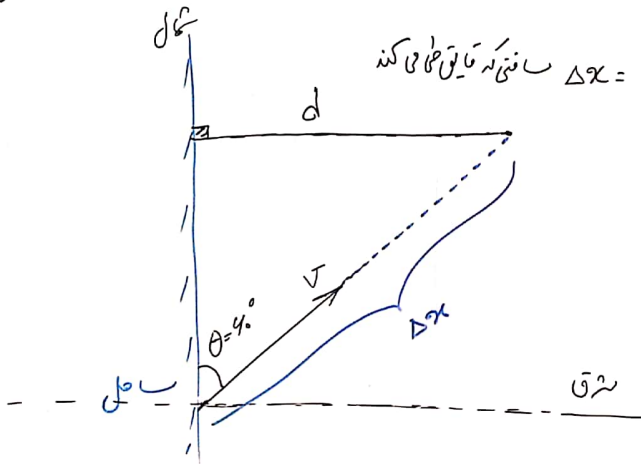
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فصل ۳

$V = 12 \frac{km}{h}$, $\theta = 4^\circ$, $\theta = 4^\circ$, $t = 12 \text{ min} = \frac{1}{5} h$, $d = ?$

$\Delta x = vt = (12) \left(\frac{1}{5} \right) = 2.4 \text{ km}$

d فاصله عمودی تا خط ساحلی است ، طبق شکل :

$$\sin \theta = \frac{d}{\Delta x} \rightarrow d = \Delta x \sin \theta = 2.4 \sin 4^\circ = 2.4 \frac{\sqrt{10}}{10} \text{ km}$$



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فضل

$$V_0 = 0, \quad V_1 = 33 \text{ m/s}, \quad \Delta x = 140 \text{ m}, \quad V_p = 54 \text{ m/s}$$



(الف) $a = ?$ $V_p^p - V_1^p = 2a \Delta x \rightarrow 54^p - 33^p = 2a(140) \rightarrow a = 0.1 \text{ m/s}^2$

(ب) $t = ?$ $V_p - V_1 = at \rightarrow 54 - 33 = 0.1 t \rightarrow t = 210 \text{ s}$

(ج) $t_1 = ?$ $V_1 - V_0 = at_1 \rightarrow 33 - 0 = 0.1 t_1 \rightarrow t_1 = 330 \text{ s}$

(د) $\Delta x_1 = ?$ $V_1^p - V_0^p = 2a \Delta x_1 \rightarrow 33^p - 0 = 2(0.1) \Delta x_1 \rightarrow \Delta x_1 = 900 \text{ m}$

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فضل ۳

$$V_0 = 0,$$

۵.۰ m سقوط ، $a = ۲ m/s^2$ ، $V = ۳ m/s$ ، $y = 0$ ، $t = ?$ ، $y_0 = ?$

$$y_1 - y_0 = -\frac{1}{2} g t_1^2 + V_0 t_1 \rightarrow -5.0 = -\frac{1}{2} (1.0) t_1^2 + 0 \rightarrow t_1 = \sqrt{10} \text{ s} \approx ۳.۲ \text{ s}$$

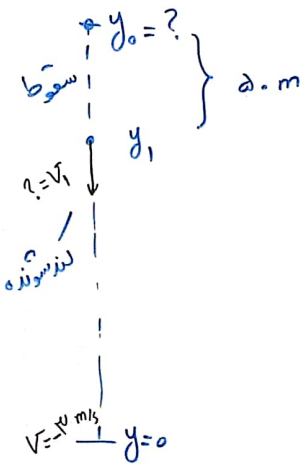
$$V_1 - V_0 = -g t_1 \rightarrow V_1 - 0 = -1.0 (۳.۲) \rightarrow V_1 = -۳.۲ \text{ m/s}$$

y , y_1 : $V^2 - V_1^2 = 2 a (y - y_1) \rightarrow 9 - (-۳.۲)^2 = ۲ (۲) (0 - y_1) \rightarrow y_1 = ۱۵.۳۷۵ \text{ m}$

$$y_0 = y_1 + 5.0 \rightarrow y_0 = ۲۰.۳۷۵ \text{ m} \quad \text{۱. تنوع هوا میا}$$

$$V - V_1 = a t_v \rightarrow -۳ - (-۳.۲) = ۲ t_v \rightarrow t_v = ۱۴.۵ \text{ s}$$

$$\text{پس } t = t_1 + t_v \rightarrow t = ۳.۲ + ۱۴.۵ = ۱۷.۷ \text{ s}$$



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فصل ۳

$$y_0 = 5 \text{ m}, \quad v_0 = 0, \quad t = 5 \text{ s},$$

؟ = عمق دریاچه (الف)

$$y - y_0 = -\frac{1}{2}gt_1^2 + v_0 t_1 \rightarrow 0 - 5 = -\frac{1}{2}(10)t_1^2 + 0 \rightarrow \underline{t_1 = 1 \text{ s}}$$

$$v_1 - v_0 = -gt_1 \rightarrow v_1 - 0 = -10(1) \rightarrow v_1 = -10 \text{ m/s}$$

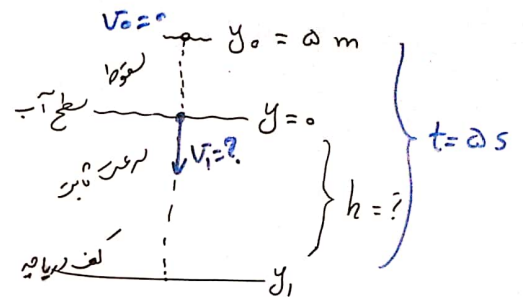
$$t_1 + t_r = 5 \text{ s} \rightarrow t_r = 5 - 1 = 4 \text{ s} \quad \text{زمان حرکت درون آب.}$$

$$y_1 - y = v_1 t_r \rightarrow -h = -10(4) \rightarrow h = 40 \text{ m} \quad \text{عمق دریاچه.}$$

(ب) $\bar{v} = ? \quad \bar{v} = \frac{\Delta y}{\Delta t} = \frac{45}{5} = 9 \text{ m/s}$

(ج) : اگر دریاچه خشک شود : $y_1 - y_0 = -\frac{1}{2}gt^2 + v_0' t \rightarrow -45 = -\frac{1}{2}(10)(5)^2 + v_0'(5) \rightarrow v_0' = 19 \text{ m/s}$

طول دریاچه باید به طرّف بالا گریز داشته باشد.



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فضل

$$V_0 = 10 \text{ m/s}$$

$$\text{في } t=0 \text{ ، } \Delta x = 4 \text{ m} \rightarrow \text{في } t=1 \text{ ، } \Delta x = ?$$

$$\begin{array}{c} \text{في } t=0 \\ \text{في } t=1 \end{array} \quad \begin{array}{c} \text{في } t=0 \\ \text{في } t=1 \end{array} \quad \Delta x = x(t=1) - x(t=0)$$

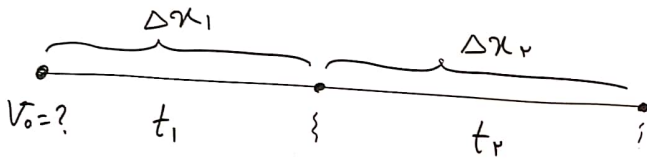
$$x = \frac{1}{2} a t^2 + V_0 t + x_0 \rightarrow \Delta x_1 = \left\{ \frac{1}{2} a (1)^2 + 10(1) + x_0 \right\} - \left\{ \frac{1}{2} a (0)^2 + 10(0) + x_0 \right\} = 4$$

$$\rightarrow 32a - 10a + 10 = 4 \rightarrow a = \frac{4}{12} = \frac{1}{3} \text{ m/s}^2$$

$$\Delta x_2 = x(t=1) - x(t=0) = \left\{ \frac{1}{2} \left(\frac{1}{3} \right) (1)^2 + 10(1) + x_0 \right\} - \left\{ \frac{1}{2} \left(\frac{1}{3} \right) (0)^2 + 10(0) + x_0 \right\} = 10 \frac{1}{3} \text{ m}$$

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فضل ۳

$$\Delta x_1 = 50 \text{ m}, t_1 = 1 \text{ s}, \quad \Delta x_2 = 50 \text{ m}, t_2 = 1 \text{ s}, \quad a = ?$$



$$\begin{aligned} \text{برای نقطه اول مسیر} \quad \Delta x_1 &= \frac{1}{2} a t_1^2 + v_0 t_1 \rightarrow 50 = \frac{1}{2} a (1)^2 + v_0 (1) \\ \text{برای نقطه دوم مسیر} \quad \Delta x &= \frac{1}{2} a t^2 + v_0 t \rightarrow 100 = \frac{1}{2} a (2)^2 + v_0 (2) \end{aligned} \quad \left. \vphantom{\begin{aligned} \Delta x_1 &= \frac{1}{2} a t_1^2 + v_0 t_1 \\ \Delta x &= \frac{1}{2} a t^2 + v_0 t \end{aligned}} \right\} \times 2$$

با حذف v_0 از دو معادله فوق :

$$150 - 100 = \frac{3}{2} a - \frac{1}{2} a \rightarrow 50 = -a \rightarrow a = -\frac{50}{1} \text{ m/s}^2$$