

HOJA 1.5. - CINEMÁTICA

1)

2)  $v = v_0 - gt \rightarrow 0 = v_0 - 9.8 \cdot 5 \rightarrow v_0 = 49 \text{ m/s}$

$y = y_0 + v_0 t - \frac{1}{2} g t^2 \rightarrow y = 0 + 49 \cdot 5 - \frac{1}{2} \cdot 9.8 \cdot 5^2 \rightarrow y = 122.5 \text{ m}$

3) a)  $y_0 = 0 + 14 = 14 \text{ m}$

$v_0 = 10 \text{ m/s}$

b)  $y_0 = 14 - 14 = 0 \text{ m}$

$v_0 = 10 \text{ m/s}$

c)  $y_0 = 14 - 27 = -13 \text{ m}$

$v_0 = 10 \text{ m/s}$



a)  $c_1$ : LVH Arriba  $\rightarrow y_1 = y_0 + v_0 t - \frac{1}{2} g t^2 \rightarrow y_1 = 0 + 80t - \frac{1}{2} \cdot 9.8 \cdot t^2$   
 $c_2$ : LVH Abajo  $\rightarrow y_2 = y_0 + v_0 t - \frac{1}{2} g t^2 \rightarrow y_2 = 300 - 80t - \frac{1}{2} \cdot 9.8 \cdot t^2$

$y_1 = y_2 \rightarrow 80t - 4.9t^2 = 300 - 80t - 4.9t^2 \rightarrow 130t = 300 \rightarrow t = 2.31 \text{ s}$

$y_1 = 80t - 4.9t^2 = 80 \cdot 2.31 - 4.9 \cdot 2.31^2 \rightarrow y_1 = 158.52 \text{ m}$

b)  $v = v_0 - gt \rightarrow 0 = 80 - 9.8t \rightarrow t = 8.16 \text{ s}$

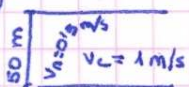
$y = y_0 + v_0 t - \frac{1}{2} g t^2 \rightarrow y = 0 + 80 \cdot 8.16 - \frac{1}{2} \cdot 9.8 \cdot 8.16^2 = 326.53 \text{ m}$

c)  $v = v_0 - gt \rightarrow v = -80 - 9.8 \cdot 4.239 = -91.54 \text{ m/s}$

$y = y_0 + v_0 t - \frac{1}{2} g t^2 \rightarrow 0 = 300 - 80t - \frac{1}{2} \cdot 9.8 \cdot t^2 \rightarrow 4.9t^2 + 80t - 300 = 0$

$t = \frac{-80 \pm \sqrt{80^2 + 4 \cdot 4.9 \cdot 300}}{2 \cdot 4.9} = \frac{-80 + 91.54}{9.8} = 4.239 \text{ s}$

5)

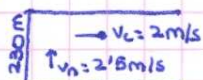


a)  $|\vec{v}| = \sqrt{|\vec{v}_c|^2 + |\vec{v}_n|^2} \rightarrow |\vec{v}| = \sqrt{1^2 + 0.5^2} = 1.118 \text{ m/s}$

b)  $y = y_0 + |\vec{v}_n| \cdot t \rightarrow 50 = 0 + 0.5t \rightarrow t = 100 \text{ s}$

c)  $x = x_0 + |\vec{v}_c| \cdot t \rightarrow x = 0 + 1 \cdot 100 = 100 \text{ m}$

6)



$y = y_0 + |\vec{v}_n| \cdot t \rightarrow 230 = 0 + 2.5t \rightarrow t = 92 \text{ s}$

7



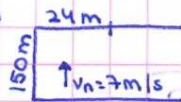
$$a) x = x_0 + |\vec{v}_c| \cdot t \rightarrow x = 0 + 10 \cdot 13'33 \text{ s} = \boxed{133'3 \text{ m}}$$

$$y = y_0 + |\vec{v}_n| \cdot t \rightarrow 120 = 0 + 9t \rightarrow t = 13'33 \text{ s.}$$

$$b) s = s_0 + |\vec{v}| \cdot t \rightarrow s = 0 + 13'45 \cdot 13'33 = \boxed{179'33 \text{ m}}$$

$$|\vec{v}| = \sqrt{|\vec{v}_n|^2 + |\vec{v}_c|^2} \rightarrow |\vec{v}| = \sqrt{9^2 + 10^2} = 13'45 \text{ m/s}$$

8



$$x = x_0 + |\vec{v}_c| \cdot t \rightarrow 24 = 0 + |\vec{v}_c| \cdot 21'43 \rightarrow \boxed{|\vec{v}_c| = 1'12 \text{ m/s}}$$

$$y = y_0 + |\vec{v}_n| \cdot t \rightarrow 150 = 0 + 7t \rightarrow t = 21'43 \text{ s.}$$

9

$$\begin{aligned} (m/s) &= \dots & (m/s) &= 21 + 0 \text{ m/s} \quad \text{⑤} \\ (m/s) &= \dots & (m/s) &= 22 - 0 \text{ m/s} \quad \text{⑥} \\ (m/s) &= \dots & (m/s) &= 23 - 0 \text{ m/s} \quad \text{⑦} \end{aligned}$$