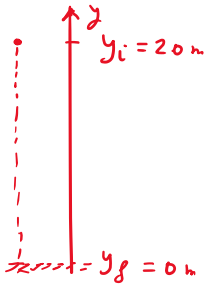
6.26

$E_{cin} = \frac{1}{2} m v^2$ ↦ si tout est converti (100%) en E_{pot}, alors $E_{cin} = E_{pot}$

$\Rightarrow \frac{1}{2} m v^2 = mgh \Rightarrow h = \frac{v^2}{2g} = \frac{81}{2 \cdot 9{,}81} = 4{,}1\,m$

6.27



y	ΔE_{cin}	ΔE_{pot}	$\Delta E_{méc}$
20	0	0	0
15	+10g	-10g	0
10	+20g	-20g	0
5	+30g	-30g	0
0	+40g	-40g	0

NB : $\Delta E_{pot} = mg\Delta h$
$= mg(y_f - y_i)$
$= 2g(y_f - y_i)$
$= 2g(y_f - 20)$

6.28

$E_{méc}(A) = \frac{1}{2} m v_A^2 + mgy_A$

$E_{méc}(B) = \frac{1}{2} m v_B^2$

$E_{méc}(A) \overset{?}{=} E_{méc}(B)$

$\frac{1}{2} m v_A^2 + mgy_A \overset{?}{=} \frac{1}{2} m v_B^2$

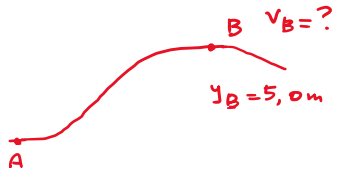
$v_A^2 + 2gy_A \overset{?}{=} v_B^2$

$3{,}5^2 + 2 \cdot g \cdot 15 \overset{?}{=} 8{,}5^2$

$306{,}55 \neq 72{,}25$!

→ $E_{méc}$ n'est pas conservée : v_B devrait être plus grand !
⇒ Il y a sans doute du frottement entre A et B

6.29



$E_{méc}(A) = \frac{1}{2} m v_A^2$

$E_{méc}(B) = \frac{1}{2} m v_B^2 + mgy_B$

L'énergie est conservée ⇒ $E_{méc}(A) = E_{méc}(B)$

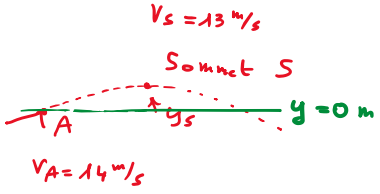
$\frac{1}{2} m v_A^2 = \frac{1}{2} m v_B^2 + mgy_B$

$v_A^2 = v_B^2 + 2gy_B$

$\Rightarrow v_B^2 = v_A^2 - 2gy_B$

$v_B = \sqrt{v_A^2 - 2gy_B} = \sqrt{121 - 2 \cdot g \cdot 81 \cdot 5} = 4{,}8\,m/s$

6.30



Conservation de l'énergie : $E_{méc}(A) = E_{méc}(S)$

$\Rightarrow \frac{1}{2} m v_A^2 = \frac{1}{2} m v_B^2 + mgy_S$

$v_A^2 = v_B^2 + 2gy_S$

$\Rightarrow y_S = \frac{v_A^2 - v_B^2}{2g} = \frac{14^2 - 13^2}{2 \cdot 9{,}81} = 1{,}4\,m$