

30 2 :

$\alpha = 30^\circ$

r

$g = 10m/s^2 :$

$J_\Delta = \frac{1}{2} m.r^2$

$\Delta$

$( m S_2 S_1 )$

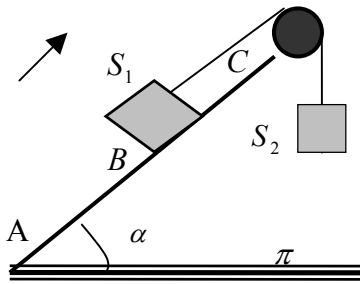
$S_1$

( 7 ) -I

$S_1$

$S_1$

منحى الحركة



( 0,5 ) .

. B A a

$S_2 S_1 (1$

(2

(1-2

:  $S_2 S_1$

$a g m S_1$

$T_1 *$

( 1 ) .  $\alpha$

( 1 ) .  $a g m S_2$

$T_2 *$

(2-2

( 1 )  $a = \frac{2}{5} (1 - \sin \alpha) \times g$  :  $S_1$

( 1 ) .  $T_2 - T_1 = 0,25N$  m

. a r  $T_2 T_1$  : (3

( 0,5 ) .  $T_2 T_1$  (4

( 0,5 ) .  $J_\Delta = 3,125 \times 10^{-4} kg.m^2$  : r (5

( 0,5 ) . (  $AB = 1m$  ) B  $S_1 v_B$  (6

$S_1 \pi S_2 B S_1$  (7

. C

A

C B  $S_1$

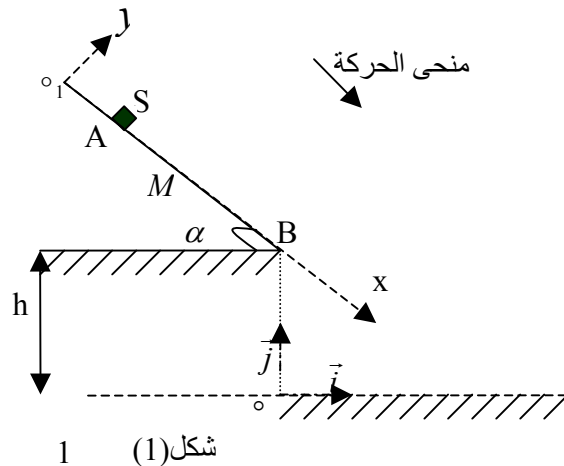
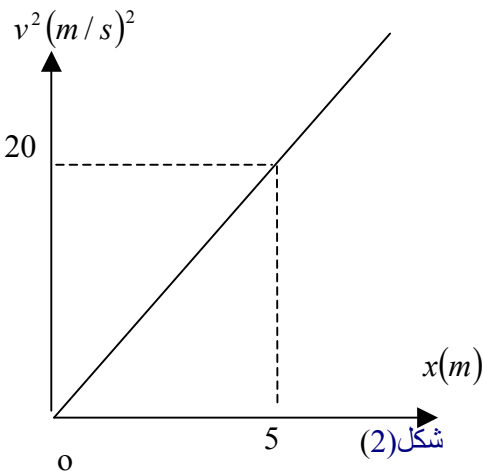
( 1 ) . B  $S_1$

( 6 ) (

.  $\alpha = 30^\circ$

$v_A = 0$

A m S



$$(0,5)(K = tg\varphi : K \quad \vec{R} \quad (o_1, y) \quad \varphi) \quad \varphi \quad \alpha \quad g \quad m \quad S \quad (1)$$

$$(1). K \quad \alpha \quad g : \quad S \quad (o_1, x) \quad (2)$$

$$: \quad AM = x \quad (3)$$

$$(0,5) . x \quad \alpha \quad g \quad m : \quad S \quad -$$

$$(0,5) . K \quad x \quad \alpha \quad g \quad m : \quad S \quad \vec{R} \quad -$$

$$(0,5) \quad v = \sqrt{2 \cdot g \cdot x (\sin \alpha - K \cos \alpha)} : M \quad S \quad (4)$$

$$K \quad a \quad S \quad x \quad v^2 \quad (2) \quad (5)$$

$$(0,5) . g = 10m/s^2 : \quad \varphi$$

$$(0,5) . AB = L = 16m : \quad \vec{v}_B \quad (6)$$

$$B \quad S \quad (o, \vec{i}, \vec{j}) \quad (7)$$

$$. h = 30m$$

$$(1) . \quad B \quad (8)$$

$$(0,5) . (o, \vec{i}) \quad S \quad P \quad (9)$$

$$(0,5) . \vec{v}_P$$

(7) (III)

$$1l \quad 25^\circ c \quad (HCl) \quad 240cm^3 \quad (1)$$

$$. S_A$$

$$(0,25) . \quad (1-1)$$

$$(1,5) . \quad pH \quad S_A \quad (2-1)$$

$$2 \quad l \quad m \quad 25^\circ c \quad (2)$$

$$. pH = 12 \quad S_B$$

$$(0,25) . \quad (1-2)$$

$$(1,5) . \quad m \quad S_B \quad (2-2)$$

$$. M \quad v_B = 4cm^3 \quad S_A \quad v_A = 6cm^3 \quad (3)$$

$$(0,25) . \quad (1-3)$$

$$(0,5) . \quad (2-3)$$

$$(1) . \quad PH \quad (3-3)$$

$$. M \quad (S_B \quad S_A) \quad v' \quad (4-3)$$

$$: \quad (1,75) . v'$$

$$V_M = 24l/mol \quad M(Na) = 23g/mol \quad M(H) = 1g/mol \quad M(O) = 16g/mol \quad Ke = 10^{-14} (mol/l)^2$$

Sbiro Abdelkrim mail: [Sbiabdou@yahoo.fr](mailto:Sbiabdou@yahoo.fr)

(6) -I

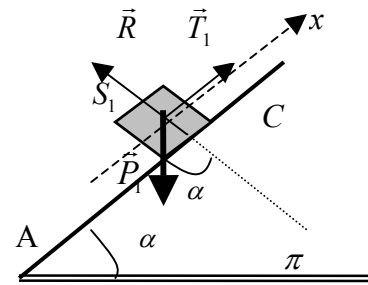
$$a = a_1 = a_2 = r \cdot \ddot{\theta} \quad : \quad (1)$$

$$: \quad \underline{S_1} \quad : 1 - 2 \quad (2)$$

$$: T_1 \quad : \vec{P}_1$$

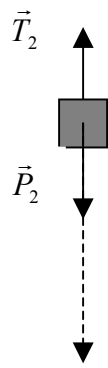
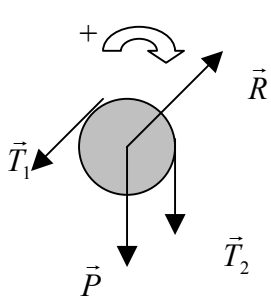
$$: \vec{R}$$

منحى الحركة →



$$m_1 = m_2 = m : \quad (a) \quad \vec{R} + \vec{P}_1 + \vec{T}_1 = m \cdot \vec{a}_G : \quad \Sigma \vec{F} = m_1 \cdot \vec{a}_G$$

$$(a) \quad \underline{T_1 = m(a + g \cdot \sin \alpha)} : \quad o - P_1 \cdot \sin \alpha + T_1 = m \cdot a$$



$$(b) \quad \vec{P}_2 + \vec{T}_2 = m \cdot \vec{a} : \quad \vec{P}_2$$

$$(b) \quad \underline{T_2 = m(g - a)} : \quad P_2 - T_2 = m \cdot a$$

: 2-2

$$M\vec{P}_\Delta + M\vec{R}_\Delta + M\vec{T}_{1\Delta} + M\vec{T}_{2\Delta} = J_\Delta \cdot \ddot{\theta}$$

$$O + O - T_1 \cdot r + T_2 \cdot r = J_\Delta \cdot \ddot{\theta}$$

$$(c) \quad \underline{T_2 - T_1 = \frac{1}{2} \cdot m \cdot a} : \quad (T_2 - T_1) \cdot r = \frac{1}{2} \cdot m \cdot r^2 \cdot \frac{a}{r} :$$

$$m \cdot [(g - a) - (a + g \cdot \sin \alpha)] = \frac{1}{2} \cdot m \cdot a \quad \Leftrightarrow \quad m(g - a) - m(a + g \cdot \sin \alpha) = \frac{1}{2} \cdot m \cdot a$$

$$g(1 - \sin \alpha) = \frac{5}{2} \cdot a \quad \Leftrightarrow \quad g(1 - \sin \alpha) = a \left( 2 + \frac{1}{2} \right) : \quad g - a - a - g \cdot \sin \alpha = \frac{1}{2} \cdot a : \quad \_$$

$$a = \frac{2}{5} (1 - \sin \alpha) \times g = 2 \text{ m/s}^2 :$$

$$\frac{1}{2} \cdot m \cdot r^2 = \frac{(T_2 - T_1) r^2}{a} \quad \Leftrightarrow \quad J_\Delta = \frac{1}{2} \cdot m \cdot r^2 \quad \ddot{\theta} = \frac{a}{r} \quad J_\Delta = \frac{(T_2 - T_1) \cdot r}{\ddot{\theta}} : \quad (3)$$

$$m = 2 \frac{(T_2 - T_1)}{a} = 0,25 \text{ kg} :$$

$$r = \sqrt{\frac{2 \cdot J_\Delta}{m}} = \sqrt{\frac{2 \times 3,125 \times 10^{-4}}{0,25}} = \sqrt{0,0025} = 0,05 \text{ m} = 5 \text{ cm} : \quad J_\Delta = \frac{1}{2} \cdot m \cdot r^2 : \quad (4)$$

$$v_A = 0 : \quad v_B^2 - v_A^2 = 2 \cdot a \cdot AB : \quad \underline{B - A} : \quad (5)$$

$$v_B = \sqrt{2 \cdot a \cdot AB} = \sqrt{2 \times 2 \times 1} = 2 \text{ m/s}$$

$$\vec{R} \quad \vec{P} \quad S_1 \quad B : \quad (6)$$

$$\vec{P} + \vec{R} = m \cdot \vec{a}' :$$

$$-m \cdot g \sin \alpha + 0 = m \cdot a' :$$

$$a' = -g \cdot \sin \alpha = -5 \text{ m/s}^2 :$$

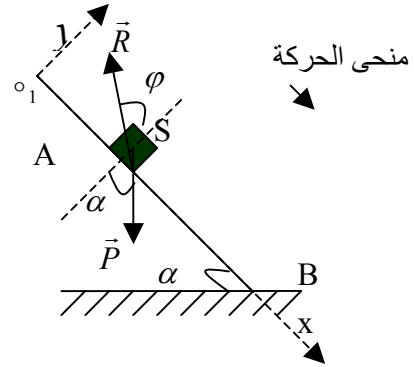
$$x = \frac{1}{2} a' t^2 + v_{0x} t + x_0 :$$

$h$   $x = -2,5t^2 + 2t + 1$  :  $x_o = AB$   $v_{o_x} = v_B$   
 :  $S$  (1 (II  
 :  $\vec{P}$   
 :  $\vec{R}$

( ) .

$(o_1, y)$

$(a) \quad \vec{P} + \vec{R} = m \cdot \vec{a}_G$  :  $S$  \_\_\_\_\_  
 $a_y = 0$   $P_y + R_y = 0$  :  $(o_1, y)$  \_\_\_\_\_  
 $-P \cos \alpha + R \cos \varphi = 0$  : \_\_\_\_\_

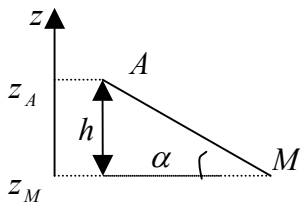


$$R = \frac{m \cdot g \cdot \cos \alpha}{\cos \varphi} \quad (1)$$

$$m \cdot g \cdot \sin \alpha - \frac{m \cdot g \cdot \cos \alpha}{\cos \varphi} \cdot \sin \varphi = m \cdot a \quad (1)$$

$$K = \tan \varphi \quad : \quad a = g(\sin \alpha - K \cdot \cos \alpha)$$

$$W\vec{P}_{A \rightarrow M} = m \cdot g(z_A - z_M) \quad (3)$$



$$AM = x$$

$$h = AM \cdot \sin \alpha \quad z_A - z_M = h$$

$$W\vec{P}_{A \rightarrow M} = m \cdot g \cdot x \cdot \sin \alpha$$

$$W\vec{R}_{A \rightarrow M} = \vec{R} \cdot \vec{AM} = R \cdot AM \cdot \cos(\vec{R}, \vec{AM}) = R \cdot AM \cdot \cos(\varphi + \frac{\pi}{2}) = -R \cdot AM \cdot \sin \varphi$$

$$: \quad AM = x \quad R = \frac{m \cdot g \cdot \cos \alpha}{\cos \varphi} \quad (1)$$

$$W\vec{R}_{A \rightarrow M} = -\frac{m \cdot g \cdot \cos \alpha}{\cos \varphi} \cdot x \cdot \sin \varphi = -m \cdot g \cdot x \cdot K \cdot \cos \alpha$$

$$W\vec{R} = -m \cdot g \cdot x \cdot K \cdot \cos \alpha$$

$$v_M = v \quad a = g(\sin \alpha - K \cdot \cos \alpha) \quad AM = x \quad v_A = 0 \quad v_M^2 - v_A^2 = 2 \cdot a \cdot AM \quad (4)$$

$$v = \sqrt{2 \cdot g \cdot x (\sin \alpha - K \cos \alpha)}$$

$$(v^2 = k \cdot x) \quad x \quad v^2 \quad (5)$$

M A

$$v^2 = 4.x \quad ; \quad k = \frac{\Delta v^2}{\Delta x} = \frac{20-0}{5-0} = 4$$

$$a = 2m/s^2 \quad ; \quad v^2 = 2.a.x \quad ;$$

$$K = \frac{g \cdot \sin \alpha - a}{g \cdot \cos \alpha} = 0,346 \quad ; \quad a = g(\sin \alpha - K \cdot \cos \alpha) \quad ;$$

$$\cdot \varphi \approx 19^\circ \quad ; \quad \varphi = \arctg 0,346 \quad ; \quad K = \tg \varphi$$

$$v_A = 0 \quad ; \quad v_B^2 - v_A^2 = 2.a.AB \quad ; \quad B - A \quad ; \quad (6)$$

$$v_B = \sqrt{2.a.AB} = \sqrt{2 \cdot 2 \cdot 16} = \sqrt{64} = 8m/s$$

$v_B = 8m/s$

$$\begin{matrix} B : & - : \vec{v}_B \text{---} \\ (o, \vec{i}) & \alpha & : & - \\ \cdot B & A & : & - \\ & 8m/s & : & - \end{matrix}$$

$$\vec{v}_B \begin{cases} + v_B \cdot \cos \alpha \\ - v_B \cdot \sin \alpha \end{cases} \quad ; t = 0 \quad ; \quad \vec{P} \quad ; \quad (7)$$

$$\vec{P} = m \cdot \vec{a}_G \quad ; \quad \text{---}$$

$$\begin{cases} v_x = Cte = v_B \cdot \cos \alpha \\ v_y = -gt - v_B \cdot \sin \alpha \end{cases} \quad \Leftarrow \quad \begin{cases} a_x = 0 \\ a_y = -g \end{cases} \quad \Leftarrow \quad \begin{cases} 0 = m \cdot a_x \\ -P = m \cdot a_y \end{cases} \quad ; \quad (o, y) \quad (o, x)$$

$$y = -\frac{1}{2}g \frac{x^2}{v_B^2 \cos^2 \alpha} - x \cdot \tg \alpha + h \quad ; \quad \begin{cases} x = (v_B \cos \alpha)t \\ y = -\frac{1}{2}gt^2 - (v_B \sin \alpha)t + h \end{cases}$$

$$y = -\frac{1}{2}g \frac{x^2}{v_B^2 \cos^2 \alpha} - x \cdot \tg \alpha + h = 0 \quad ; \quad y = 0 \quad ; \quad P \quad ; \quad (8)$$

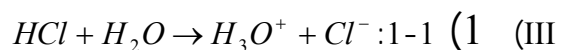
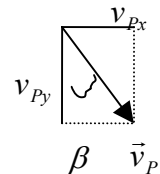
$$x_p > 0 \quad x_2 = -14,6 \quad x_1 = 20 \quad ; \quad \Delta = 12,3 \quad ; \quad 0,1 \cdot x^2 - 0,58 \cdot x - 30 = 0 \quad ;$$

$$\begin{cases} x_p = 20m \\ y_p = 0 \end{cases} \quad ; \quad P \quad ; \quad \underline{x_p = 20m}$$

$$v_p = \sqrt{v_{px}^2 + v_{py}^2} = \sqrt{(v_B \cdot \cos \alpha)^2 + (-gt_p - v_B \cdot \sin \alpha)^2} \quad ; \quad ; \quad \vec{v}_p \quad ; \quad (9)$$

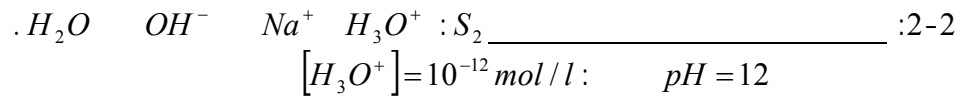
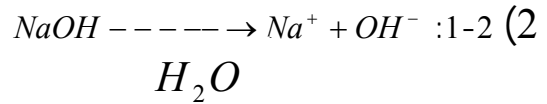
$$v_p = \sqrt{(8 \times 0,866)^2 + (10 \times 2,9 + 8 \times 0,5)^2} \approx 34m/s \quad ; \quad t_p = \frac{x_p}{v_B \cdot \cos \alpha} = \frac{20}{8 \times 0,866} \approx 2,9s \quad ;$$

$$\cdot \beta \approx 12^\circ \quad ; \quad \tg \beta = \frac{v_{px}}{v_{py}} = \frac{6,928}{33} = 0,21 \quad ; \quad (o, \vec{j}) \quad \beta \quad ; \quad \vec{v}_p$$



$$c_A = [H_3O^+] = [Cl^-] = \frac{v(HCl)}{V_M \cdot V_S} = \frac{0,24}{24 \times 1} = 10^{-2} mol/l$$

$$pH = -\log[H_3O^+] = -\log 10^{-2} = 2 \quad ; \quad [OH^-] = \frac{10^{-14}}{10^{-2}} = 10^{-12} mol/l$$

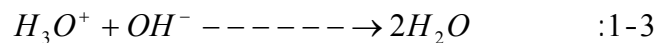


$$[OH^-] = \frac{10^{-14}}{10^{-12}} = 10^{-2} \text{ mol/l}$$

$$c_B = c(NaOH) = [Na^+] = [OH^-] = \frac{m}{M.V_S} = 10^{-2} \text{ mol/l} \quad :$$

$$[Na^+] = 10^{-2} \text{ mol/l} :$$

$$m = c_B \times M \times V_S = 10^{-2} \times 40 \times 2 = 0,8g$$



$$n(H_3O^+) = c_A v_A = 10^{-2} \times 6 \times 10^{-3} = 6 \times 10^{-5} \text{ mol} \quad :2-3$$

$$n(OH^-) = c_B v_B = 10^{-2} \times 4 \times 10^{-3} = 4 \times 10^{-5} \text{ mol}$$

$$n(H_3O^+) > n(OH^-)$$

$$[H_3O^+] = \frac{c_A v_A - c_B v_B}{v_A + v_B} = \frac{10^{-2} \times 6 \times 10^{-3} - 10^{-2} \times 4 \times 10^{-3}}{10 \times 10^{-3}} = \frac{2 \times 10^{-5}}{10^{-2}} = 2 \times 10^{-3} \text{ mol/l} \quad :3-3$$

$$pH = -\log [H_3O^+] = -\log 2 \times 10^{-3} = 2,7$$

$$v' \quad :4-3$$

$$c_A v_A = c_B (v_B + v')$$

$$v' = \frac{c_A v_A - c_B v_B}{c_B} = \frac{10^{-2} (6 \times 10^{-3} - 4 \times 10^{-3})}{10^{-2}} = 2 \times 10^{-3} \text{ l} = 2 \text{ cm}^3 :$$

Sbiro Abdelkrim mail: [Sbiabdou@yahoo.fr](mailto:Sbiabdou@yahoo.fr)

[www.madariss.fr](http://www.madariss.fr)



