

① $v = 72 \frac{\text{km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$
 $x_0 = 25 \text{ km} = 25.000 \text{ m}$
 $x = ?$
 $t_0 = 0$
 $t = 40 \text{ min} = 2400 \text{ s}$

$$x = x_0 + v(t - t_0)$$

$$x = 25.000 + 20(2400 - 0)$$

$$\boxed{x = 73.000 \text{ m} = 73 \text{ km}}$$

② $x_{01} = 0$ $x_{02} = 0$
 $v_1 = 63 \frac{\text{km}}{\text{h}}$ $v_2 = 90 \frac{\text{km}}{\text{h}} = 25 \frac{\text{m}}{\text{s}}$
 $t_{01} = 0$ $t_{02} = 15 \text{ s}$

$$x_1 = x_{01} + v_1(t - t_{01})$$

$$x_1 = 0 + 17,5(t - 0)$$

$$x_1 = 17,5t \text{ (SI)}$$

$$x_2 = x_{02} + v_2(t - t_{02})$$

$$x_2 = 0 + 25(t - 15)$$

$$x_2 = 25t - 375 \text{ SI}$$

$$17,5t = 25t - 375$$

$$-7,5t = -375$$

$$t = \frac{375}{7,5} = 50 \text{ s}$$

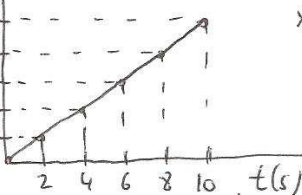
$$\boxed{x_1 = 17,5 \cdot 50 = 875 \text{ m}}$$

③ $v_0 = 0$
 $a = 5 \frac{\text{m}}{\text{s}^2}$
 $x_0 = 0$
 $t_0 = 0$

$$v = v_0 + a(t - t_0)$$

$$v = 5t \text{ (SI)}$$

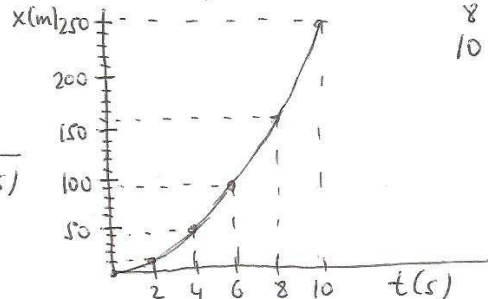
t(s)	v(m/s)	v(m/s)
0	0	50
2	10	40
4	20	30
6	30	20
8	40	10
10	50	



$$x = x_0 + v_0(t - t_0) + \frac{1}{2}a(t - t_0)^2$$

$$x = 0 + 0 + \frac{1}{2}5(t - 0)^2$$

$$x = 2,5t^2 \text{ (SI)}$$



t(s)	x(m)
0	0
2	10
4	40
6	90
8	160
10	250

④ $v_0 = 108 \frac{\text{km}}{\text{h}} = 30 \frac{\text{m}}{\text{s}}$
 $t_0 = 0$
 $t = 8 \text{ s}$
 $v = 0$
 $x_0 = 0$

$$v = v_0 + a(t - t_0)$$

$$0 = 30 + a(8 - 0)$$

$$a = -3,75 \frac{\text{m}}{\text{s}^2}$$

$$x = x_0 + v_0(t - t_0) + \frac{1}{2}a(t - t_0)^2$$

$$x = 0 + 30 \cdot 8 + \frac{1}{2}(-3,75) \cdot 8^2$$

$$\boxed{x = 120 \text{ m}}$$

⑤ $v = 0$
 $x = ?$
 $a = -9,8 \frac{\text{m}}{\text{s}^2}$
 $v_0 = 81 \frac{\text{km}}{\text{h}} = 22,5 \frac{\text{m}}{\text{s}}$
 $x_0 = 0$
 $t_0 = 0$

$$v = v_0 + a(t - t_0)$$

$$0 = 22,5 - 9,8(t - 0)$$

$$9,8t = 22,5$$

$$t = \frac{22,5}{9,8} = 2,296 \text{ s}$$

$$x = x_0 + v_0(t - t_0) + \frac{1}{2}a(t - t_0)^2$$

$$x = 0 + 22,5 \cdot 2,296 + \frac{1}{2}(-9,8) \cdot 2,296^2$$

$$\boxed{x = 25,83 \text{ m}}$$

⑥ $\omega = 10 \frac{\text{voltes}}{\text{min}} \cdot \frac{2\pi \text{ rad}}{1 \text{ volta}} \cdot \frac{1 \text{ min}}{60 \text{ s}} = 1,047 \frac{\text{rad}}{\text{s}}$
 $t = 5 \text{ h} \cdot \frac{3600 \text{ s}}{1 \text{ h}} = 18000 \text{ s}$
 $s = ?$
 $r = 0,5 \text{ m}$

$$\varphi = \varphi_0 + \omega(t - t_0)$$

$$\varphi = 0 + 1,047 \cdot 18000$$

$$\varphi = 18.846 \text{ rad}$$

$$\boxed{s = \varphi \cdot r = 18.846 \cdot 0,5 = 9.423 \text{ m}}$$

① Què és l'acceleració mitjana d'un mòbil, entre dos instants, en un moviment rectilini? Com la podem trobar matemàticament?

② Què és la velocitat angular en un moviment circular uniforme? Com la podem trobar matemàticament?

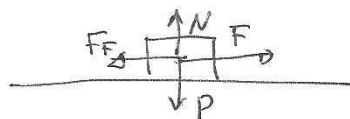
① $m = 25 \text{ Kg}$
 $v_0 = 0$
 $x = 5 \text{ m}$
 $t = 10 \text{ s}$
 $F_F = 20 \text{ N}$

$$x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$$

$$5 = 0 + 0 + \frac{1}{2}a(10-0)^2$$

$$10 = a \cdot 100$$

$$a = 0.1 \frac{\text{m}}{\text{s}^2}$$

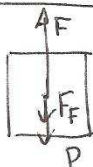


$$F - F_F = m \cdot a$$

$$F - 20 = 25 \cdot 0.1$$

$$\boxed{F = 22.5 \text{ N}}$$

② $F = 8 \text{ Kp} = 78.4 \text{ N}$
 $m = 5 \text{ Kg}$ $v_0 = 0$
 $F_F = 10 \text{ N}$
 $t = ?$ $v = 5 \frac{\text{m}}{\text{s}}$



$$F - F_F - P = m \cdot a$$

$$78.4 - 10 - 5 \cdot 9.8 = 5 \cdot a$$

$$a = 3.88 \frac{\text{m}}{\text{s}^2}$$

$$v = v_0 + a(t-t_0)$$

$$5 = 0 + 3.88 \cdot t$$

$$\boxed{t = 1.289 \text{ s}}$$

③ $g_J = 26 \frac{\text{m}}{\text{s}^2}$

$$P_J = 50 \text{ Kp} = 490 \text{ N}$$

$$M_v = 4.87 \cdot 10^{24} \text{ Kg}$$

$$R_v = 6.052 \text{ Km} = 6.052 \cdot 10^6 \text{ m}$$

$$G = 667 \cdot 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{Kg}^2}$$

$$P_J = m \cdot g_J$$

$$490 = m \cdot 26$$

$$m = \frac{490}{26} = 18.85 \text{ Kg}$$

$$P_v = G \frac{M_v \cdot m}{R_v^2}$$

$$P_v = 667 \cdot 10^{-11} \frac{4.87 \cdot 10^{24} \cdot 18.85}{6.052 \cdot 10^6^2}$$

$$\boxed{P_v = 1672 \text{ N}}$$

④ $m = 20 \text{ Kg}$
 $C = 4 \text{ cm} = 0.04 \text{ m}$

$$S = L \cdot C^2 = 4 \cdot 0.04^2 = 0.0064 \text{ m}^2$$

$$\boxed{p = \frac{F}{S} = \frac{mg}{S} = \frac{20 \cdot 9.8}{0.0064} = 30625 \text{ Pa}}$$

⑤ $h = 250 \text{ m}$
 $r = 15 \text{ cm} = 0.15 \text{ m}$
 $d_{a.m.} = 1.030 \frac{\text{Kg}}{\text{m}^3}$

$$P = p \cdot g \cdot h = 1.030 \cdot 9.8 \cdot 250 = 2523.500 \text{ Pa}$$

$$\boxed{F = p \cdot S = 2523.500 \cdot 0.07069 = 178400 \text{ N}}$$

$$S = \pi r^2 = \pi \cdot 0.15^2 = 0.07069 \text{ m}^2$$

⑥ $m = 600 \text{ g} = 0.6 \text{ Kg}$
 $v_e = ?$
 $d_a = 1000 \frac{\text{Kg}}{\text{m}^3}$
 $d_f = 700 \frac{\text{Kg}}{\text{m}^3}$

$$P = m \cdot g = 0.6 \cdot 9.8 = 5.88 \text{ N}$$

$$E = P = 5.88 \text{ N}$$

$$E = \rho_e \cdot V_s \cdot g$$

$$5.88 = 1000 \cdot V_s \cdot 9.8$$

$$V_s = 6 \cdot 10^{-4} \text{ m}^3$$

$$V = \frac{m}{\rho_f} = \frac{0.6}{700} = 8.571 \cdot 10^{-4} \text{ m}^3$$

$$\boxed{V_e = V - V_s = 8.571 \cdot 10^{-4} - 6 \cdot 10^{-4} = 2.571 \cdot 10^{-4} \text{ m}^3}$$

(A) Què diu la tercera llei de Newton?

(B) Què diu el principi d'Arquimedes?

① $F = 20 \text{ Kp} \cdot \frac{9.8 \text{ N}}{1 \text{ Kp}} = 196 \text{ N}$
 $\alpha = 30^\circ$
 $\Delta x = 5 \text{ m}$
 $\Delta t = 2 \text{ min} = 120 \text{ s}$

$$W = F \cdot \Delta x \cdot \cos \alpha = 196 \cdot 5 \cdot \cos 30^\circ = 848.7 \text{ J}$$

$$\overline{P} = \frac{W}{\Delta t} = \frac{848.7}{120} = 7.073 \text{ W}$$

② $m = 5 \text{ Kg}$ $v_0 = 0$
 $h_0 = 30 \text{ m}$
 $v = ?$
 $h = 10 \text{ m}$

$$E_{m_0} = E_m$$

$$\frac{1}{2} m v_0^2 + m g h_0 = \frac{1}{2} m v^2 + m g h$$

$$5 \cdot 9.8 \cdot 30 = \frac{1}{2} \cdot 5 \cdot v^2 + 5 \cdot 9.8 \cdot 10$$

$$v = 19.80 \frac{\text{m}}{\text{s}}$$

③ $h_0 = 0$
 $m = 4 \text{ Kg}$
 $v_0 = 72 \frac{\text{km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$
 $F_F = 6 \text{ N}$
 $h = ?$
 $v = 0$

$$E_{m_0} + W_{FF} = E_m$$

$$\frac{1}{2} m v_0^2 + m g h_0 + W_{FF} = \frac{1}{2} m v^2 + m g h$$

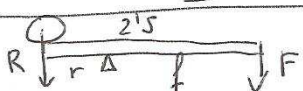
$$\frac{1}{2} \cdot 4 \cdot 20^2 + 0 - 6 h = 4 \cdot 9.8 \cdot h$$

$$800 = 45.2 h$$

$$h = 17.70 \text{ m}$$

$$W_{FF} = F_F \cdot \Delta x \cdot \cos 180^\circ = 6 \cdot h \cdot (-1) = -6h \text{ (J)}$$

④ $m = 400 \text{ Kg}$
 $F = 150 \text{ Kp} = 1470 \text{ N}$



$$R = P = m g = 400 \cdot 9.8 = 3920 \text{ N}$$

$$R \cdot r = F \cdot l$$

$$3920 \cdot r = 1470 \cdot (2.5 - r)$$

$$3920 \cdot r = 3675 - 1470 \cdot r$$

$$5390 r = 3675$$

$$r = \frac{3675}{5390} = 0.6818 \text{ m}$$

⑤ $m_1 = 90 \text{ g}$ $c_{e1} = 0.093 \frac{\text{cal}}{\text{g} \cdot ^\circ\text{C}}$
 $T_{01} = 300^\circ\text{C}$
 $m_2 = 2 \text{ l H}_2\text{O} = 2000 \text{ g}$
 $c_{e2} = 1 \frac{\text{cal}}{\text{g} \cdot ^\circ\text{C}}$
 $T = 20.5^\circ\text{C}$
 $T_{02} = ?$

$$Q_1 + Q_2 = 0$$

$$m_1 (c_{e1} (T - T_{01}) + m_2 \cdot (c_{e2} (T - T_{02}) = 0$$

$$90 \cdot 0.093 (20.5 - 300) + 2000 \cdot 1 (20.5 - T_{02}) = 0$$

$$-2339 + 41000 - 2000 T_{02} = 0$$

$$2000 T_{02} = 38661$$

$$T_{02} = 19.33^\circ\text{C}$$

⑥ $M = 25 \text{ Kg}$
 $-\Delta h = 3 \text{ m}$
 $m = 700 \text{ g}$
 $T_0 = 20^\circ\text{C}$

$$W = -M g \Delta h = -25 \cdot 9.8 \cdot (-3) = 735 \text{ J} \cdot \frac{0.24 \text{ cal}}{1 \text{ J}} = 176.4 \text{ cal}$$

$$Q = m c_e \Delta T$$

$$176.4 = 700 \cdot 1 \cdot (T - 20)$$

$$176.4 = 700 T - 14000$$

$$T = \frac{14176.4}{700} = 20.25^\circ\text{C}$$

A) Què és la potència?

B) Explica la llei de la palanca.

① $\lambda = 0.5 \text{ m}$
 $\Delta t = 30 \text{ s}$
 $\Delta x = 14 \text{ m}$

$$v = \frac{\Delta x}{\Delta t} = \frac{14}{30} = 0.4667 \frac{\text{m}}{\text{s}}$$

$$v = \lambda \cdot \nu ; \quad \boxed{\nu = \frac{v}{\lambda} = \frac{0.4667}{0.5} = 0.9334 \text{ Hz}}$$

② $\lambda_{\text{air}} = 70 \text{ cm} = 0.7 \text{ m}$
 $\lambda_{\text{agua}} = ?$

$$v_{\text{air}} = 340 \frac{\text{m}}{\text{s}}$$

$$v_{\text{agua}} = 1.44 \frac{\text{km}}{\text{s}} = 1.440 \frac{\text{m}}{\text{s}}$$

$$v_{\text{air}} = \lambda_{\text{air}} \cdot \nu_{\text{air}} ; \quad \nu_{\text{air}} = \frac{v_{\text{air}}}{\lambda_{\text{air}}} = \frac{340}{0.7} = 485.7 \text{ Hz}$$

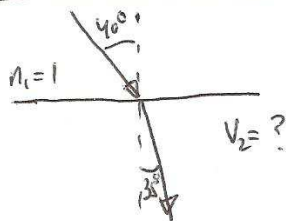
$$v_{\text{agua}} = \lambda_{\text{agua}} \cdot \nu_{\text{agua}} ; \quad \boxed{\lambda_{\text{agua}} = \frac{v_{\text{agua}}}{\nu_{\text{agua}}} = \frac{1.440}{485.7} = 2.965 \text{ m}}$$

③ $\nu = 400 \text{ Hz}$
 $v = 6000 \frac{\text{m}}{\text{s}}$

$$v = \lambda \cdot \nu$$

$$\boxed{\lambda = \frac{v}{\nu} = \frac{6000}{400} = 15 \text{ m}}$$

④ $i = 40^\circ$
 $r = 35^\circ$



$$n_1 \cdot \sin i = n_2 \cdot \sin r$$

$$1 \cdot \sin 40^\circ = n_2 \cdot \sin 35^\circ$$

$$\frac{\sin 40^\circ}{\sin 35^\circ} = n_2 ; \quad n_2 = 1.121$$

$$\boxed{v_2 = \frac{c}{n_2} = \frac{3 \cdot 10^8}{1.121} = 2.676 \cdot 10^8 \frac{\text{m}}{\text{s}}}$$

⑤ $v_1 = 1.9 \cdot 10^8 \frac{\text{m}}{\text{s}}$
 $n_2 = 1$

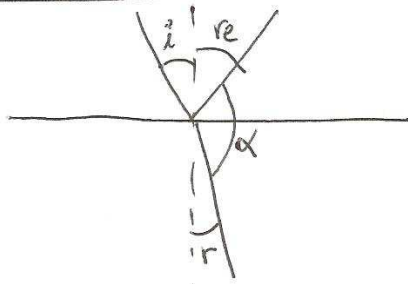
$$n_1 = \frac{c}{v_1} = \frac{3 \cdot 10^8}{1.9 \cdot 10^8} = 1.579$$

$$n_1 \cdot \sin i_p = n_2 \cdot \sin 90^\circ$$

$$1.579 \cdot \sin i_p = 1 \cdot 1$$

$$\boxed{i_p = 39.29^\circ}$$

⑥ $i = 26^\circ$
 $n_1 = 1$
 $v_2 = 1.8 \cdot 10^8 \frac{\text{m}}{\text{s}}$
 $\alpha = ?$



$$r_e = i = 26^\circ$$

$$n_2 = \frac{c}{v_2} = \frac{3 \cdot 10^8}{1.8 \cdot 10^8} = 1.667$$

$$n_1 \cdot \sin i = n_2 \cdot \sin r$$

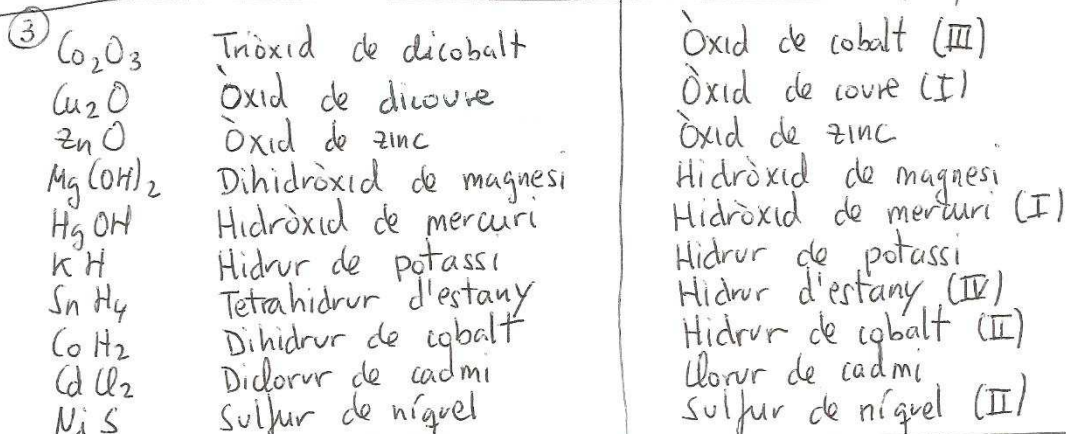
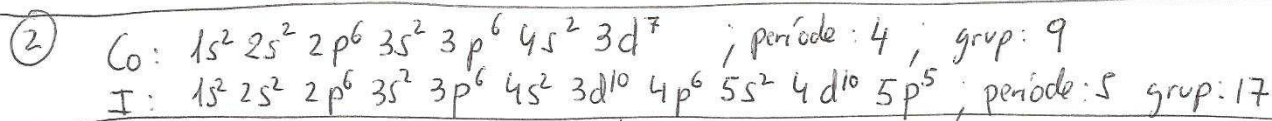
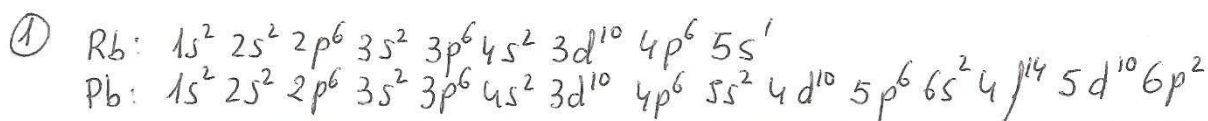
$$1 \cdot \sin 26^\circ = 1.667 \cdot \sin r$$

$$r = 15.25^\circ$$

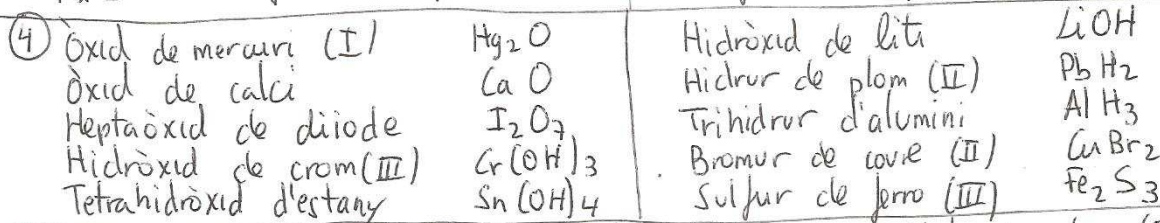
$$\boxed{\alpha = 180^\circ - 26^\circ - 15.25^\circ = 138.75^\circ}$$

A) Què és una ona?

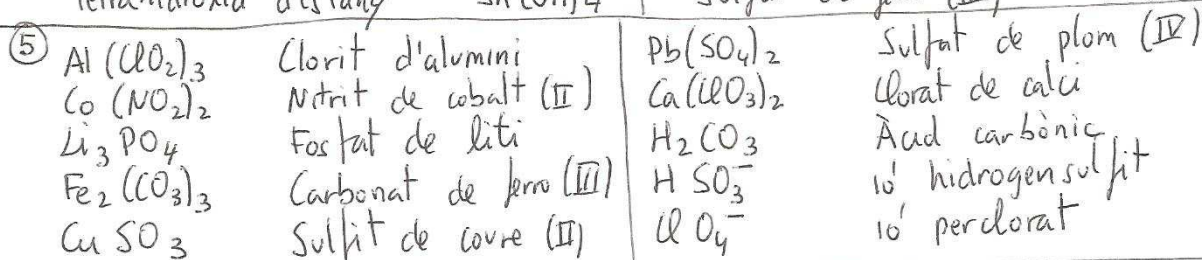
B) Què és l'angle límit en una refracció? Quan existeix angle límit?



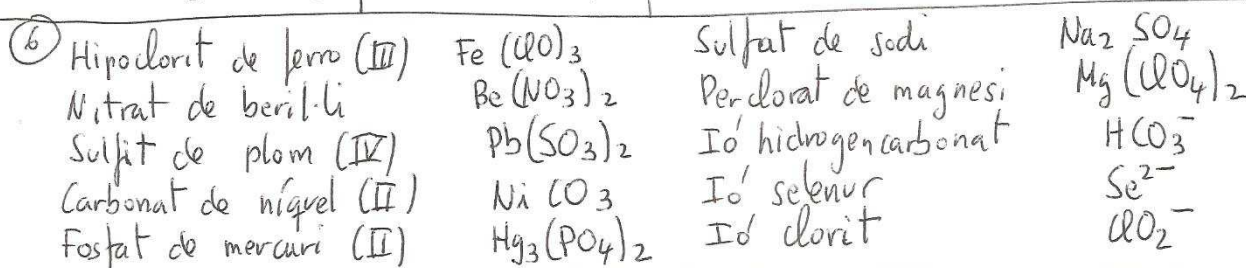
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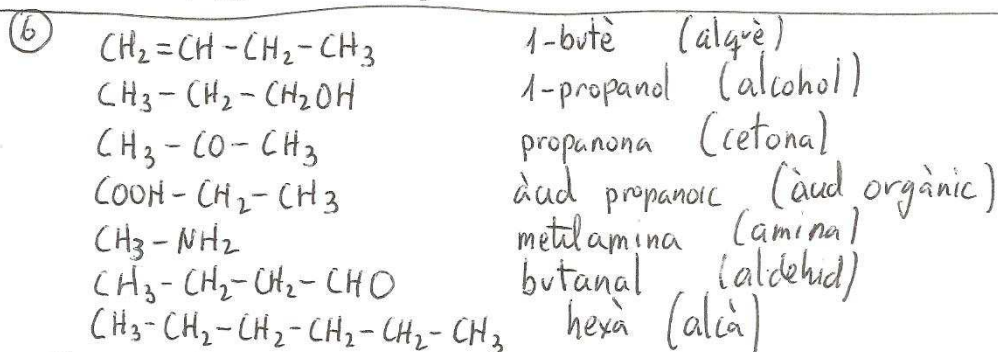
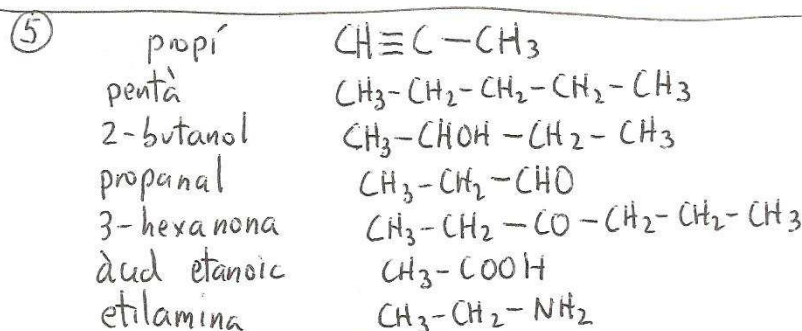
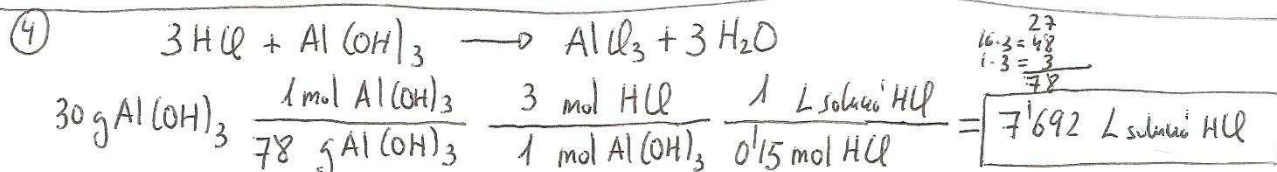
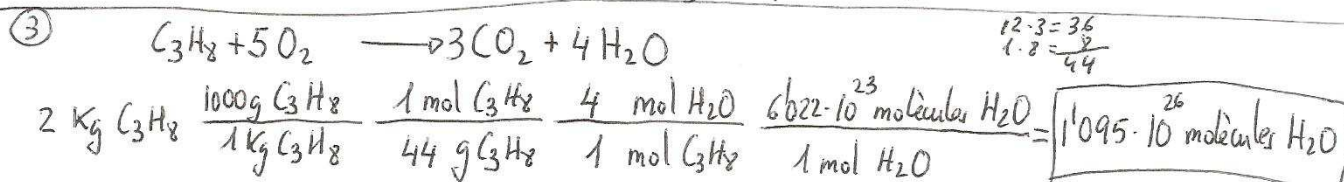
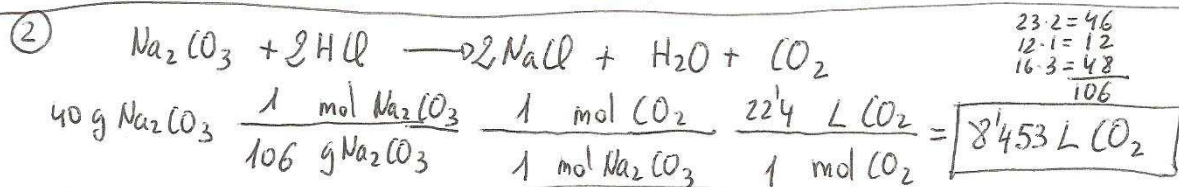
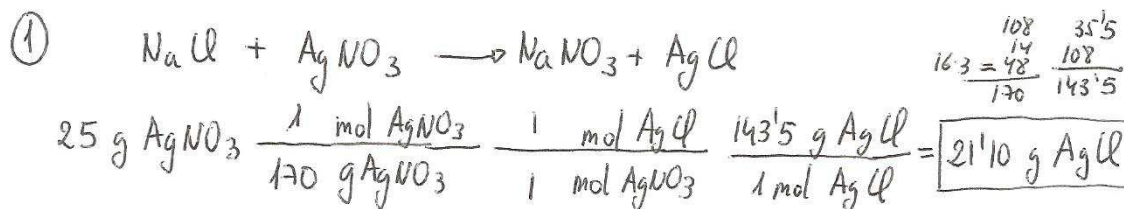
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014

A) Què és un enllaç iònic ?

B) Escriv el nom i la fórmula de deu oxoàcids



- (A) Què és una reacció de neutralització? Escriu un exemple
- (B) Quins tipus d'hidrocarburs de cadena lineal hi ha? Quina és la seva característica?

① $V_0 = 126 \frac{\text{km}}{\text{h}} = 35 \frac{\text{m}}{\text{s}}$
 $x = 50 \text{ m}$

$$x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2 \quad v = v_0 + a(t-t_0)$$

$$50 = 0 + 35t + 0.5a t^2 \quad 0 = 35 + a t$$

$$50 = 35t + 0.5(-\frac{35}{t})t^2 \quad a = -\frac{35}{t}$$

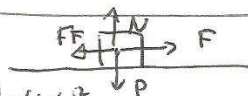
$$50 = 35t - 17.5t \quad \rightarrow \boxed{t = 2.857 \text{ s}}$$

② $x = 10 \text{ m}$
 $t = 15 \text{ s}$

$$x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$$

$$10 = 0 + 0 + \frac{1}{2}a \cdot 15^2$$

$$a = \frac{20}{15^2} = 0.08889 \frac{\text{m}}{\text{s}^2}$$



$m = 20 \text{ kg}$
 $F_f = 20 \text{ N}$

$$F - F_f = m \cdot a$$

$$F - 20 = 20 \cdot 0.08889$$

$$\boxed{F = 21.78 \text{ N}}$$

③ $P_N = 200 \text{ N}$
 $g_J = 26 \frac{\text{m}}{\text{s}^2}$

$R_N = 24.750 \text{ km} = 24.750.000 \text{ m}$

$$P_N = G \frac{M_N \cdot m}{R_N^2} ; \quad 200 = 6.67 \cdot 10^{-11} \cdot \frac{1.03 \cdot 10^{26} \cdot m}{24.750.000^2}$$

$m = 17.83 \text{ kg}$

$$\boxed{P_J = m g_J = 17.83 \cdot 26 = 463.6 \text{ N}}$$

④ $h = ?$
 $v = 0$
 $F_f = 5 \text{ N}$
 $h_0 = 0$
 $v_0 = 72 \frac{\text{km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$
 $m = 3 \text{ kg}$

$$E_{m0} + W_{Ff} = E_m$$

$$W_{Ff} = F_f \cdot \Delta x \cdot \cos 180^\circ = 5 \cdot h \cdot (-1) = -5h \text{ (J)}$$

$$\frac{1}{2} m v_0^2 + m g h_0 + W_{Ff} = \frac{1}{2} m v^2 + m g h$$

$$\frac{1}{2} 3 \cdot 20^2 - 5h = 3 \cdot 9.8 \cdot h$$

$$600 = 34.4h \quad \rightarrow \boxed{h = \frac{600}{34.4} = 17.44 \text{ m}}$$

⑤ $m_1 = 60 \text{ g}$
 $T_{01} = 350^\circ \text{C}$
 $m_2 = 2000 \text{ g}$
 $T_{02} = 15^\circ \text{C}$

$c_{e1} = 0.093 \frac{\text{cal}}{\text{g}^\circ \text{C}}$
 $c_{e2} = 1 \frac{\text{cal}}{\text{g}^\circ \text{C}}$

$$m_1 \cdot c_{e1} (T - T_{01}) + m_2 \cdot c_{e2} (T - T_{02}) = 0$$

$$60 \cdot 0.093 (T - 350) + 2000 \cdot 1 (T - 15) = 0$$

$$5.58T - 1953 + 2000T - 30000 = 0$$

$$2005.58T = 31.953$$

$$\boxed{T = 15.93^\circ \text{C}}$$

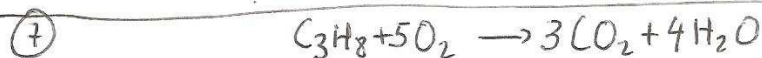
⑥ $n_1 = 1$
 $i = 35^\circ$
 $r = 25^\circ$

$$n_1 \cdot \sin i = n_2 \cdot \sin r$$

$$1 \cdot \sin 35^\circ = n_2 \cdot \sin 25^\circ$$

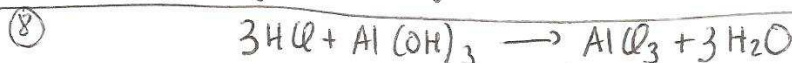
$$n_2 = 1.357$$

$$\boxed{v_2 = \frac{c}{n_2} = \frac{3 \cdot 10^8}{1.357} = 2.21 \cdot 10^8 \frac{\text{m}}{\text{s}}}$$



$$\frac{12.3}{1.8} = \frac{36}{4.4}$$

$$2 \text{ kg C}_3\text{H}_8 \cdot \frac{1000 \text{ g C}_3\text{H}_8}{1 \text{ kg C}_3\text{H}_8} \cdot \frac{1 \text{ mol C}_3\text{H}_8}{44 \text{ g C}_3\text{H}_8} \cdot \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \cdot \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \boxed{3.273 \text{ g H}_2\text{O}}$$



$$\frac{27.1}{16.3} = \frac{27}{48}$$

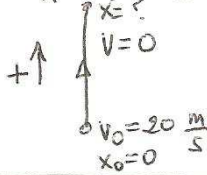
$$1.3 = \frac{27}{48}$$

$$25 \text{ g Al}(\text{OH})_3 \cdot \frac{1 \text{ mol Al}(\text{OH})_3}{78 \text{ g Al}(\text{OH})_3} \cdot \frac{3 \text{ mol HCl}}{1 \text{ mol Al}(\text{OH})_3} \cdot \frac{1 \text{ L solució HCl}}{0.2 \text{ mol HCl}} = \boxed{4.808 \text{ L solució HCl}}$$

⑨ Què diu la segona llei de Newton?

⑩ Què és un enllaç covalent?

$$① \quad V_0 = 72 \frac{\text{Km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$$



$$V^2 = V_0^2 + 2a(x - x_0)$$

$$0^2 = 20^2 + 2(-9.8)(x - 0)$$

$$0 = 400 - 19.6x$$

$$\boxed{x = \frac{400}{19.6} = 20.41 \text{ m}}$$

$$② \quad F - F_f - P = m \cdot a \quad 88.2 - 10 - 58.8 = 6 \cdot a$$

$$F_f = P = m \cdot g = 6 \cdot 9.8 = 58.8 \text{ N} \quad a = 3.233 \frac{\text{m}}{\text{s}^2}$$

$$F = 9 k_p \frac{q \cdot l}{l k_p} = 88.2 \text{ N}$$

$$x = x_0 + v_0(t - t_0) + \frac{1}{2}a(t - t_0)^2$$

$$3 = 0 + 0 + \frac{1}{2}3.233(t - 0)^2 \Rightarrow \boxed{t = 1.362 \text{ s}}$$

$$③ \quad g_J = 26 \frac{\text{m}}{\text{s}^2}$$

$$P_J = 30 k_p \frac{q \cdot l}{l k_p} = 294 \text{ N}$$

$$P_V = ?$$

$$P_J = m g_J$$

$$294 = m \cdot 26$$

$$m = 11.31 \text{ Kg}$$

$$P_V = G \frac{M_V \cdot m}{R_V^2}$$

$$\boxed{P_V = 6.67 \cdot 10^{-11} \cdot \frac{4.87 \cdot 10^{24} \cdot 11.31}{6.052 \cdot 10^8^2} = 100.3 \text{ N}}$$

$$④ \quad \begin{cases} h = ? \\ v = 0 \\ F_f = 6 \text{ N} \end{cases}$$

$$m = 5 \text{ Kg}$$

$$v_0 = 90 \frac{\text{Km}}{\text{h}} = 25 \frac{\text{m}}{\text{s}}$$

$$h_0 = 0$$

$$E_{m_0} + W_{F_f} = E_m$$

$$\frac{1}{2}mv_0^2 + mgh_0 + W_{F_f} = \frac{1}{2}mv^2 + mgh$$

$$\frac{1}{2}5 \cdot 25^2 - 6h = 5 \cdot 9.8h$$

$$1562.5 = 55h \Rightarrow \boxed{h = 28.41 \text{ m}}$$

$$W_{F_f} = F_f \cdot \Delta x \cdot \cos 180^\circ$$

$$= 6 \cdot h \cdot (-1) = -6h$$

$$⑤ \quad \begin{cases} m_1 = 30 \text{ g} \\ T_{01} = 300^\circ \text{C} \\ c_{e1} = 0.093 \frac{\text{cal}}{\text{g}^\circ \text{C}} \end{cases} \quad \begin{cases} m_2 = 2000 \text{ g} \\ T_{02} = 15^\circ \text{C} \\ c_{e2} = 1 \frac{\text{cal}}{\text{g}^\circ \text{C}} \end{cases}$$

$$m_1 \cdot c_{e1} (T - T_{01}) + m_2 \cdot c_{e2} (T - T_{02}) = 0$$

$$30 \cdot 0.093 (T - 300) + 2000 \cdot 1 \cdot (T - 15) = 0$$

$$2.79T - 837 + 2000T - 30000 = 0$$

$$2002.79T = 30837$$

$$\boxed{T = 15.40^\circ \text{C}}$$

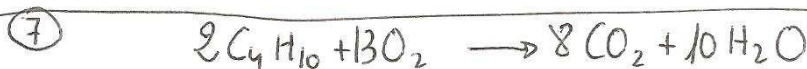
$$⑥ \quad \begin{cases} i = 35^\circ \\ r = 30^\circ \end{cases}$$

$$n_1 \cdot \sin i = n_2 \cdot \sin r$$

$$1 \cdot \sin 35^\circ = n_2 \cdot \sin 30^\circ$$

$$n_2 = 1.147$$

$$\boxed{v_2 = \frac{c}{n_2} = \frac{3 \cdot 10^8}{1.147} = 2.616 \cdot 10^8 \frac{\text{m}}{\text{s}}}$$



$$3 \text{ Kg C}_4\text{H}_{10} \cdot \frac{1000 \text{ g C}_4\text{H}_{10}}{1 \text{ Kg C}_4\text{H}_{10}} \cdot \frac{1 \text{ mol C}_4\text{H}_{10}}{58 \text{ g C}_4\text{H}_{10}} \cdot \frac{8 \text{ mol CO}_2}{2 \text{ mol C}_4\text{H}_{10}} \cdot \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{9.103 \text{ g CO}_2}$$



$$40 \text{ g Al(OH)}_3 \cdot \frac{1 \text{ mol Al(OH)}_3}{78 \text{ g Al(OH)}_3} \cdot \frac{3 \text{ mol HCl}}{1 \text{ mol Al(OH)}_3} \cdot \frac{1 \text{ l solució HCl}}{0.15 \text{ mol HCl}} = \boxed{10.26 \text{ l solució HCl}}$$

⑨ Què diu el principi d'Arquimedes?

⑩ Què és una ona?