

$$V = \frac{35.000}{1500} = 23,33 \frac{\text{m}}{\text{s}}$$

$$\boxed{X = 20 \cdot 18'43 = 368'6 \text{ m}}$$

$$\begin{aligned} X &= X_0 + V_0(t-t_0) + \frac{1}{2}a(t-t_0)^2 \\ X &= 0 + 50(t-0) + \frac{1}{2}(-5)(t-0)^2 \\ X &= 50t - 2.5t^2 \end{aligned}$$

| $t(s)$ | $x(m)$ |
|--------|--------|
| 0      | 0      |
| 2      | 90     |
| 4      | 160    |
| 6      | 210    |
| 8      | 240    |
| 10     | 250    |

$$v = v_0 + a(t - t_0)$$
$$25 = 0 + a(6 - 0)$$
$$25 = a \cdot 6$$
$$a = \frac{25}{6} = 4.167 \frac{\text{m}}{\text{s}^2}$$

$$x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$$
$$x = 0 + 0(6-0) + \frac{1}{2}4(6)^2$$
$$x = 72 \text{ m}$$

$$X = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$$
$$0 = 20 + 0 + \frac{1}{2}(-9.8)(t-0)^2$$
$$0 = 20 - 4.9t^2$$
$$t = \sqrt{\frac{20}{4.9}} = \begin{matrix} 2.020 \text{ s} \\ -2.020 \text{ s} \end{matrix}$$

$$V = -19.80 \frac{\text{m}}{\text{s}}$$

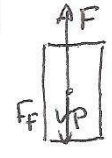
(6)  $r = 50 \text{ cm} = 0.5 \text{ m}$   
 $\omega = 10 \frac{\text{volts}}{\text{min}} \frac{2\pi \text{ rad}}{1 \text{ volta}} \frac{1 \text{ min}}{60 \text{ s}} = 1.047 \frac{\text{rad}}{\text{s}}$   
 $S = ?$   
 $t = 20 \text{ min} \frac{60 \text{ s}}{1 \text{ min}} = 1200 \text{ s}$

$$\begin{aligned}\varphi &= \varphi_0 + \omega(t - t_0) \\ \varphi &= 0 + 1'047(1200 - 0) \\ \varphi &= 1256 \text{ rad} \\ \boxed{s = \varphi \cdot r = 1256 \cdot 0'5 = 628 \text{ m}}\end{aligned}$$

(A) Què és la trajectòria d'un moviment?

(B) Com són les gràfiques velocitat-temps en un moviment rectilini uniforme i en un moviment rectilini uniformement accelerat?

①  $F = ?$   $t_0 = 0$   $F - F_f = m \cdot a$   $v = v_0 + a(t - t_0)$   
 $m = 20 \text{ Kg}$   $t = 5 \text{ s}$   $F - 8 = 20 \cdot 2$   $10 = 0 + a \cdot 5$   
 $v_0 = 0$   $F_f = 8 \text{ N}$   $\boxed{F = 48 \text{ N}}$   $a = 2 \frac{\text{m}}{\text{s}^2}$   
 $v = 36 \frac{\text{Km}}{\text{h}} = 10 \frac{\text{m}}{\text{s}}$

②   $m = 450 \text{ Kg}$   $F_f = 200 \text{ N}$   $F - F_f - P = m \cdot a$   
 $v_0 = 0$   $x = x_0 + v_0(t - t_0) + \frac{1}{2} a(t - t_0)^2$   $F - 200 - 450 \cdot 9.8 = 450 \cdot 0.25$   
 $x = 2 \text{ m}$   $2 = 0 + 0 + \frac{1}{2} a \cdot 4^2$   $\boxed{F = 4722.5 \text{ N}}$   
 $t = 4 \text{ s}$   $2 = 0 + 0 + \frac{1}{2} a \cdot 4^2$   
 $\frac{4}{16} = a$  ;  $a = 0.25 \frac{\text{m}}{\text{s}^2}$

③  $P_N = 150 \text{ N}$   $M_N = 1.03 \cdot 10^{26} \text{ Kg}$   $P_N = G \frac{M_N \cdot m}{r^2}$   
 $P_J = ?$   $R_N = 24.750 \text{ Km} = 24.750.000 \text{ m}$   $150 = 6.67 \cdot 10^{-11} \frac{1.03 \cdot 10^{26} \cdot m}{24.750.000^2}$   
 $g_J = 26 \frac{\text{m}}{\text{s}^2}$   $G = 6.67 \cdot 10^{-11} \frac{\text{N} \cdot \text{m}^2}{\text{Kg}^2}$   $m = \frac{150 \cdot 24.750.000^2}{6.67 \cdot 10^{-11} \cdot 1.03 \cdot 10^{26}} = 13.37 \text{ Kg}$   
 $\boxed{P_J = m g_J = 13.37 \cdot 26 = 347.6 \text{ N}}$

④  $m = 25 \text{ Kg}$   $F = P = mg = 25 \cdot 9.8 = 245 \text{ N}$   
 $S = 4 \cdot \pi r^2 = 4 \cdot \pi \cdot 2^2 \text{ cm}^2 = 50.27 \text{ cm}^2 \frac{10^{-4} \text{ m}^2}{1 \text{ cm}^2} = 0.005027 \text{ m}^2$   
 $\boxed{P = \frac{F}{S} = \frac{245}{0.005027} = 48.740 \text{ Pa}}$

⑤  $h = 180 \text{ m}$   $S = \pi \cdot r^2 = \pi \cdot 0.18^2 = 0.1018 \text{ m}^2$   
 $F = ?$   $P = \rho \cdot g \cdot h = 1.030 \cdot 9.8 \cdot 180 = 1.817.000 \text{ Pa}$   
 $r = 18 \text{ cm} = 0.18 \text{ m}$   $\boxed{F = P \cdot S = 1.817.000 \cdot 0.1018 = 184.970 \text{ N}}$   
 $\rho = 1.030 \frac{\text{Kg}}{\text{m}^3}$

⑥  $m = 400 \text{ g} = 0.4 \text{ Kg}$   $P = m \cdot g = 0.4 \cdot 9.8 = 3.92 \text{ N}$   $V = \frac{m}{\rho} = \frac{0.4}{8.960} = 4.464 \cdot 10^{-5} \text{ m}^3$   
 $\rho_{\text{corre}} = 8.960 \frac{\text{Kg}}{\text{m}^3}$   $E = \rho \cdot V \cdot g = 790 \cdot 4.464 \cdot 10^{-5} \cdot 9.8 = 0.3456 \text{ N}$   
 $\rho_{\text{alcohol}} = 790 \frac{\text{Kg}}{\text{m}^3}$   $\boxed{P_a = P - E = 3.92 - 0.3456 = 3.574 \text{ N}}$

(A) Què diu la primera llei de Newton?

(B) Explica el principi de la premsa hidràulica.

①  $W_v = \Delta E_p = m g \Delta h = 300 \cdot 9.8 \cdot 10 = 29.400 \text{ J}$   
 $\eta = \frac{W_v}{W_T} \cdot 100$  ;  $W_T = \frac{W_v \cdot 100}{\eta} = \frac{29.400 \cdot 100}{60} = 49.000 \text{ J}$   
 $\overline{P_T} = \frac{W_T}{\Delta t} = \frac{49.000}{20} = 2450 \text{ W}$

②  $h = ?$   
 $v = 0$   
 $m = 3 \text{ kg}$   
 $h_0 = 5 \text{ m}$   
 $v_0 = 90 \frac{\text{km}}{\text{h}} = 25 \frac{\text{m}}{\text{s}}$   
 $E_{m0} = E_m$   
 $\frac{1}{2} m v_0^2 + m g h_0 = \frac{1}{2} m v^2 + m g h$   
 $\frac{1}{2} 25^2 + 9.8 \cdot 5 = 9.8 h$   
 $h = 36.89 \text{ m}$

③  $v_0 = 72 \frac{\text{km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$   
 $h_0 = 15 \text{ m}$   
 $v = ?$   
 $h = 0$   
 $F_F = 6 \text{ N}$   
 $m = 2 \text{ kg}$   
 $E_{m0} + W_{FF} = E_m$   
 $W_{FF} = F_F \cdot \Delta x \cdot \cos 180^\circ = 6 \cdot 15 (-1) = -90 \text{ J}$   
 $\frac{1}{2} m v_0^2 + m g h_0 + W_{FF} = \frac{1}{2} m v^2 + m g h$   
 $\frac{1}{2} 2 \cdot 20^2 + 2 \cdot 9.8 \cdot 15 - 90 = \frac{1}{2} 2 \cdot v^2 + 2 \cdot 9.8 \cdot 0$   
 $v = 24.58 \frac{\text{m}}{\text{s}}$

④  $d_R = 50 \text{ cm} = 0.5 \text{ m}$   
 $d_F = 2 - 0.5 = 1.5 \text{ m}$   
 $F = 50 \text{ N}$   
 $m = ?$   
 $F \cdot d_F = R \cdot d_R$   
 $50 \cdot 1.5 = R \cdot 0.5$   
 $R = 150 \text{ N}$   
 $R = m \cdot g$   
 $150 = m \cdot 9.8$   
 $m = \frac{150}{9.8} = 15.31 \text{ kg}$

⑤  $m_1 = 600 \text{ g}$   
 $T_{01} = 200^\circ \text{C}$   
 $m_2 = 2 \text{ L H}_2\text{O} = 2000 \text{ g}$   
 $T_{02} = 25^\circ \text{C}$   
 $C_{e1} = 0.093 \frac{\text{cal}}{\text{g} \cdot ^\circ \text{C}}$   
 $C_{e2} = 1 \frac{\text{cal}}{\text{g} \cdot ^\circ \text{C}}$   
 $m_1 \cdot C_{e1} (T - T_{01}) + m_2 \cdot C_{e2} (T - T_{02}) = 0$   
 $600 \cdot 0.093 (T - 200) + 2000 \cdot 1 \cdot (T - 25) = 0$   
 $55.8 (T - 200) + 2000 (T - 25) = 0$   
 $55.8 T - 11160 + 2000 T - 50.000 = 0$   
 $2055.8 T = 61.160$   
 $T = 29.75^\circ \text{C}$

⑥  $m = 25 \text{ kg}$   
 $-\Delta h = 3 \text{ m}$   
 $m_{\text{H}_2\text{O}} = 1 \text{ L} = 1000 \text{ g}$   
 $T = ?$   
 $T_0 = 20^\circ \text{C}$   
 $-\Delta E_p = m \cdot g (\Delta h) = 25 \cdot 9.8 \cdot 3 = 735 \text{ J}$   
 $\frac{0.24 \text{ cal}}{1 \text{ J}} = 176.4 \text{ cal}$   
 $Q = m_{\text{H}_2\text{O}} \cdot (e \cdot (T - T_0))$   
 $176.4 = 1000 \cdot 1 \cdot (T - 20)$   
 $176.4 = 1000 T - 20.000$   
 $T = 20.18^\circ \text{C}$

A) Què és l'energia cinètica d'un cos?

B) Quan es conserva l'energia mecànica d'un cos?

①  $v = 5.500 \frac{m}{s}$   
 $\lambda = 12 m$

$$v = \frac{\lambda}{T} ; \quad \boxed{T = \frac{\lambda}{v} = \frac{12}{5.500} = 2.182 \cdot 10^{-3} s}$$

②  $\lambda = 20 cm = 0.2 m$   
 $\Delta t = 20 s$   
 $\Delta x = 15 m$

$$v = \frac{\Delta x}{\Delta t} = \frac{15}{20} = 0.75 \frac{m}{s}$$

$$v = \lambda \cdot \nu \quad \boxed{\nu = \frac{v}{\lambda} = \frac{0.75}{0.2} = 3.75 Hz}$$

③  $\lambda_{aigua} = 60 cm = 0.6 m$   
 $\lambda_{aire} = ?$   
 $v_{aure} = 340 \frac{m}{s}$   
 $v_{aigua} = 1.44 \frac{km}{s} = 1.440 \frac{m}{s}$

$$v_{aigua} = \lambda_{aigua} \cdot \nu_{aigua}$$

$$1440 = 0.6 \cdot \nu_{aigua} ; \quad \nu_{aigua} = 2400 Hz$$

$$\nu_{aure} = \nu_{aigua} = 2400 Hz$$

$$\boxed{\lambda_{aure} = \frac{v_{aure}}{\nu_{aure}} = \frac{340}{2400} = 0.1417 m}$$

④  $i = 35^\circ$   
 $v_2 = 2.2 \cdot 10^8 \frac{m}{s}$   
 $n_1 = 1$

$$n_2 = \frac{c}{v_2} = \frac{3 \cdot 10^8}{2.2 \cdot 10^8} = 1.364$$

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

$$1 \cdot \sin 35^\circ = 1.364 \cdot \sin r$$

$$\boxed{r = \sin^{-1} \left( \frac{\sin 35^\circ}{1.364} \right) = 24.87^\circ}$$

⑤  $v_1 = 2 \cdot 10^8 \frac{m}{s}$   
 $v_2 = 2.25 \cdot 10^8 \frac{m}{s}$

$$n_1 = \frac{c}{v_1} = \frac{3 \cdot 10^8}{2 \cdot 10^8} = 1.5$$

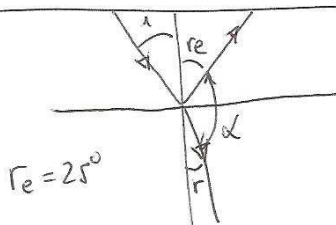
$$n_2 = \frac{c}{v_2} = \frac{3 \cdot 10^8}{2.25 \cdot 10^8} = 1.333$$

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

$$1.5 \cdot \sin \lambda_e = 1.333 \cdot 1$$

$$\boxed{\lambda_e = \sin^{-1} \left( \frac{1.333}{1.5} \right) = 62.71^\circ}$$

⑥  $n_1 = 1$   
 $i = 25^\circ$   
 $v_2 = 1.9 \cdot 10^8 \frac{m}{s}$



$$n_2 = \frac{c}{v_2} = \frac{3 \cdot 10^8}{1.9 \cdot 10^8} = 1.579$$

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

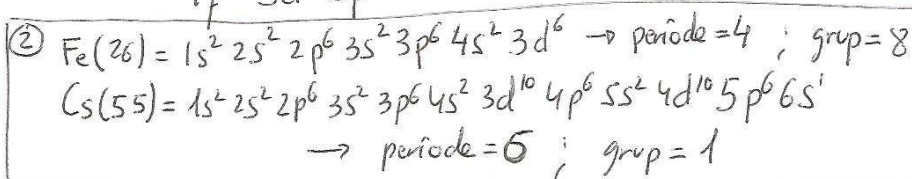
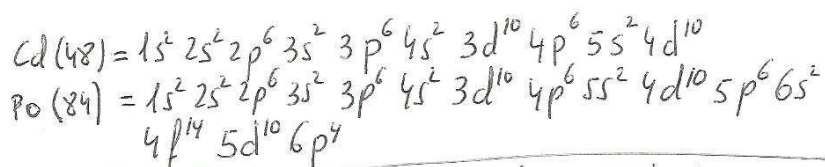
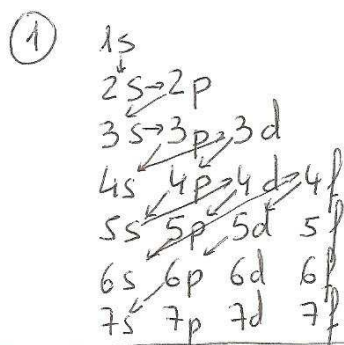
$$1 \cdot \sin 25^\circ = 1.579 \cdot \sin r$$

$$r = \sin^{-1} \left( \frac{\sin 25^\circ}{1.579} \right) = 15.52^\circ$$

$$\boxed{\alpha = 180^\circ - 25^\circ - 15.52^\circ = 139.48^\circ}$$

A) Què és una ona mecànica?

B) Què és la reflexió de la llum?



③

|                          |                        |                        |
|--------------------------|------------------------|------------------------|
| $\text{Al}_2\text{O}_3$  | Triòxid de dialumini   | Òxid d'alumini         |
| $\text{CuO}$             | Òxid de coure          | Òxid de coure (II)     |
| $\text{Co}_2\text{O}_3$  | Triòxid de dicobalt    | Òxid de cobalt (III)   |
| $\text{Sn}(\text{OH})_4$ | Tetrahidròxid d'estany | Hidròxid d'estany (IV) |
| $\text{AuOH}$            | Hidròxid d'or          | Hidròxid d'or (I)      |
| $\text{NaH}$             | Hidrur de sodi         | Hidrur de sodi         |
| $\text{PbH}_2$           | Dihidrur de plom       | Hidrur de plom (II)    |
| $\text{NiH}_3$           | Trihidrur de níquel    | Hidrur de níquel (III) |
| $\text{BaH}_2$           | Dihidrur de bari       | Hidrur de bari         |
| $\text{PbS}_2$           | Disulfur de plom       | Sulfur de plom (IV)    |

0'07

④

|                       |                          |                      |                          |
|-----------------------|--------------------------|----------------------|--------------------------|
| Òxid de coure (I)     | $\text{Cu}_2\text{O}$    | Hidròxid d'estronci  | $\text{Sr}(\text{OH})_2$ |
| Òxid d'alumini        | $\text{Al}_2\text{O}_3$  | Hidrur d'estany (II) | $\text{SnH}_2$           |
| Pentaòxid de diclor   | $\text{Cl}_2\text{O}_5$  | Trihidrur de cobalt  | $\text{CoH}_3$           |
| Hidròxid de crom (II) | $\text{Cr}(\text{OH})_2$ | Iodur de ferro (II)  | $\text{FeI}_2$           |
| Tetrahidròxid de plom | $\text{Pb}(\text{OH})_4$ | Selenur de plom (IV) | $\text{PbSe}_2$          |

0'14

⑤

|                              |                          |                              |                       |
|------------------------------|--------------------------|------------------------------|-----------------------|
| $\text{Cu}(\text{ClO})_2$    | Hipoclorit de coure (II) | $\text{Fe}_2(\text{SO}_4)_3$ | Sulfat de ferro (III) |
| $\text{Ni}(\text{NO}_3)_3$   | Nitrat de níquel (III)   | $\text{Ca}(\text{ClO}_2)_2$  | Clorit de calci       |
| $\text{Na}_3\text{PO}_4$     | Fosfat de sodi           | $\text{HClO}_4$              | àcid perclòric        |
| $\text{Al}_2(\text{CO}_3)_3$ | Carbonat d'alumini       | $\text{HCO}_3^-$             | ió hidrogen carbonat  |
| $\text{HgSO}_3$              | Sulfit de mercuri (II)   | $\text{ClO}_3^-$             | ió clorat             |

0'14

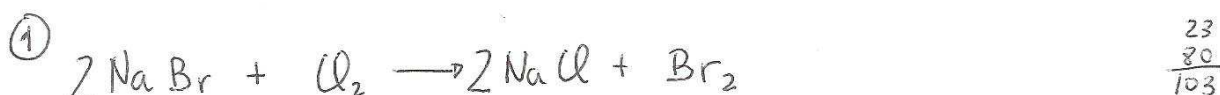
⑥

|                      |                              |                      |                             |
|----------------------|------------------------------|----------------------|-----------------------------|
| Clorit de plom (II)  | $\text{Pb}(\text{ClO}_2)_2$  | Sulfit de cadmi      | $\text{CdSO}_3$             |
| Nitrit de magnesi    | $\text{Mg}(\text{NO}_2)_2$   | Clorat de crom (III) | $\text{Cr}(\text{ClO}_3)_3$ |
| Sulfat d'estany (IV) | $\text{Sn}(\text{SO}_4)_2$   | ió hidrogen sulfit   | $\text{HSO}_3^-$            |
| Carbonat d'alumini   | $\text{Al}_2(\text{CO}_3)_3$ | ió bromur            | $\text{Br}^-$               |
| Fosfat de bari       | $\text{Ba}_3(\text{PO}_4)_2$ | ió carbonat          | $\text{CO}_3^{2-}$          |

0'14

(A) Què és un enllaç covalent? Indica dos exemples.

(B) Què és un àcid? Escribeu el nom i la fórmula de tres hidràcids i tres oxoàcids.



$$60 \text{ g NaBr} \cdot \frac{1 \text{ mol NaBr}}{103 \text{ g NaBr}} \cdot \frac{1 \text{ mol Br}_2}{2 \text{ mol NaBr}} \cdot \frac{160 \text{ g Br}_2}{1 \text{ mol Br}_2} = \boxed{46.60 \text{ g Br}_2}$$



$$20 \text{ g H}_2 \cdot \frac{1 \text{ mol H}_2}{2 \text{ g H}_2} \cdot \frac{1 \text{ mol Zn}}{1 \text{ mol H}_2} \cdot \frac{6.022 \cdot 10^{23} \text{ atoms Zn}}{1 \text{ mol Zn}} = \boxed{6.022 \cdot 10^{24} \text{ atoms Zn}}$$



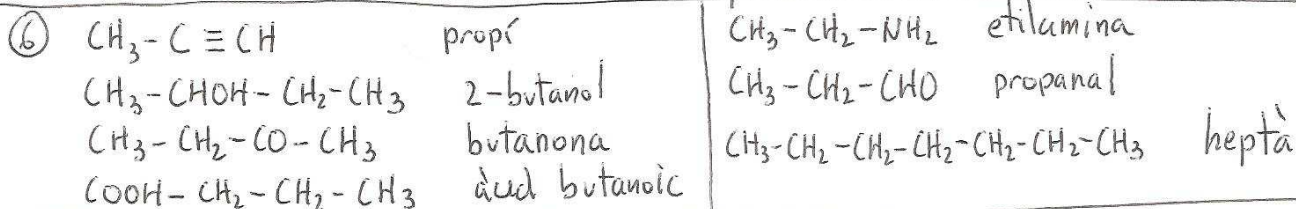
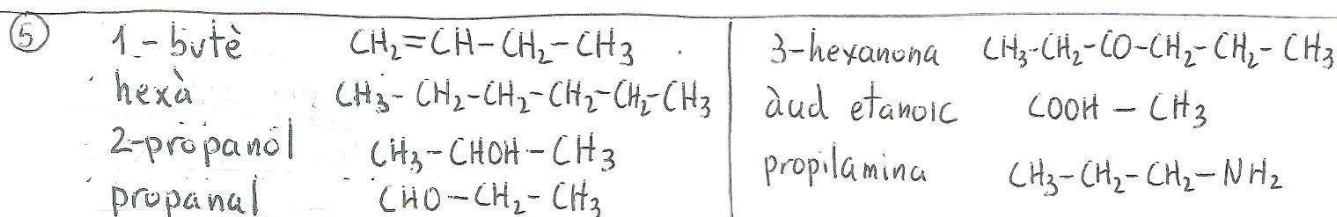
$$5 \text{ kg C}_5\text{H}_{12} \cdot \frac{1000 \text{ g C}_5\text{H}_{12}}{1 \text{ kg C}_5\text{H}_{12}} \cdot \frac{1 \text{ mol C}_5\text{H}_{12}}{72 \text{ g C}_5\text{H}_{12}} \cdot \frac{8 \text{ mol O}_2}{1 \text{ mol C}_5\text{H}_{12}} \cdot \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} = \boxed{12.444 \text{ L O}_2}$$

$\begin{array}{r} 12 \cdot 5 = 60 \\ 1 \cdot 12 = 12 \\ \hline 72 \end{array}$



$$400 \text{ cm}^3 \text{ solució} \cdot \frac{1 \text{ L solució}}{1000 \text{ cm}^3 \text{ solució}} \cdot \frac{0.15 \text{ mols HCl}}{1 \text{ L solució}} \cdot \frac{1 \text{ mol Ca(OH)}_2}{2 \text{ mol HCl}} \cdot \frac{74 \text{ g Ca(OH)}_2}{1 \text{ mol Ca(OH)}_2} = \boxed{2.22 \text{ g Ca(OH)}_2}$$

$\begin{array}{r} 40 \\ 32 \\ 2 \\ \hline 74 \end{array}$



A) Què és una reacció de síntesi? Escriu un exemple

B) Què és un alcohol? Què és una cetona?

①  $v_0 = 0$   
 $v = 90 \frac{\text{km}}{\text{h}} = 25 \frac{\text{m}}{\text{s}}$   
 $t = 5 \text{ s}$

$v = v_0 + a(t - t_0)$   
 $25 = 0 + a(5 - 0)$   
 $a = 5 \frac{\text{m}}{\text{s}^2}$

$x = x_0 + v_0(t - t_0) + \frac{1}{2}a(t - t_0)^2$   
 $x = 0 + 0 + \frac{1}{2} \cdot 5 \cdot (5 - 0)^2$   
 $x = 62.5 \text{ m}$

②  $m = 400 \text{ kg}$   
 $v_0 = 0$   
 $a = 0.25 \frac{\text{m}}{\text{s}^2}$   
 $F_F = 250 \text{ N}$   
 $F = ?$



$F - P - F_F = m \cdot a$   
 $F - 400 \cdot 9.8 - 250 = 400 \cdot 0.25$   
 $F = 4.270 \text{ N}$

③  $P_N = 150 \text{ N}$   
 $P_J = ?$   
 $g_J = 26 \frac{\text{m}}{\text{s}^2}$

$P_N = G \frac{M_N \cdot m}{R_N^2}$   
 $150 = 6.67 \cdot 10^{-11} \cdot \frac{1.03 \cdot 10^{26} \cdot m}{24.750.000^2}$   
 $m = 13.37 \text{ kg}$

$P_J = m g_J = 13.37 \cdot 26 = 347.6 \text{ N}$

④  $m = 4 \text{ kg}$   
 $h_0 = 10 \text{ m}$   
 $v_0 = 0$   
 $F_F = 5 \text{ N}$   
 $h = 0$   
 $v = ?$

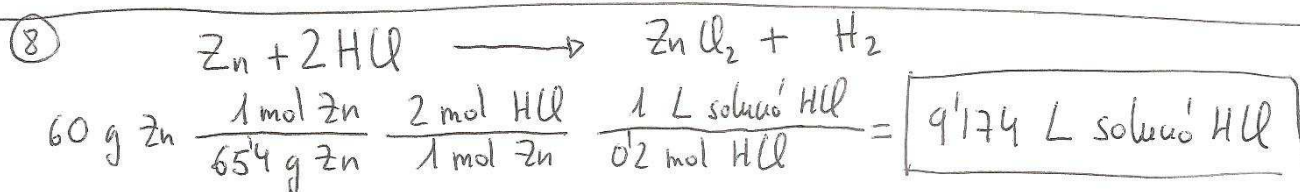
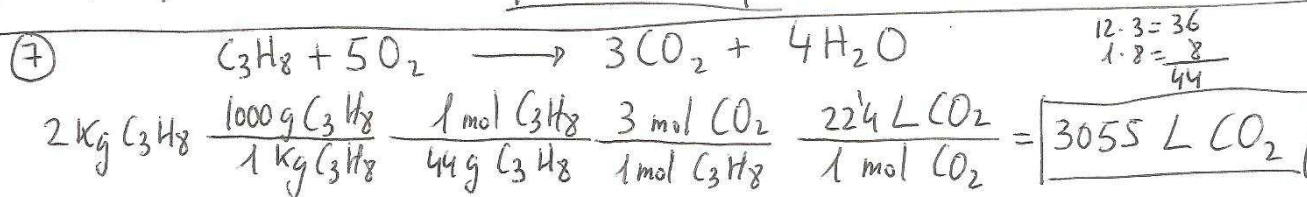
$\frac{1}{2}mv_0^2 + mgh_0 + W_{FF} = \frac{1}{2}mv^2 + mgh$   
 $4 \cdot 9.8 \cdot 10 - 50 = \frac{1}{2} \cdot 4 \cdot v^2$   
 $W_{FF} = F_F \cdot \Delta x \cdot \cos 180^\circ = 5 \cdot 10 \cdot (-1) = -50 \text{ J}$   
 $v = 13.08 \frac{\text{m}}{\text{s}}$

⑤  $m_1 = 300 \text{ g}$   
 $m_2 = 2 \text{ L H}_2\text{O} = 2000 \text{ g}$   
 $T_{02} = 20^\circ \text{C}$   
 $T = 21^\circ \text{C}$   
 $T_{01} = ?$

$C_{e1} \cdot m_1 (T - T_{01}) + C_{e2} \cdot m_2 (T - T_{02}) = 0$   
 $0.093 \cdot 300 (21 - T_{01}) + 1 \cdot 2000 (21 - 20) = 0$   
 $585.9 - 27.9 T_{01} + 2000 = 0$   
 $T_{01} = 92.68^\circ \text{C}$

⑥  $i = 25^\circ$   
 $n_1 = 1$   
 $n_2 = 1.4$   
 $r = ?$

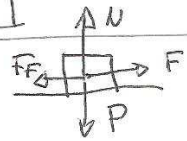
$n_1 \cdot \sin i = n_2 \cdot \sin r$   
 $1 \cdot \sin 25^\circ = 1.4 \cdot \sin r$   
 $r = 17.57^\circ$



⑨ Què diu la tercera llei de Newton?

⑩ Què és una reacció de neutralització?

①  $x_0 = 25 \text{ m}$   $x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$   $v = v_0 + a(t-t_0)$   
 $x = 0$   $0 = 25 + 0(t-0) + \frac{1}{2}(-9.8)(t-0)^2$   $v = 0 - 9.8(2.259 - 0)$   
 $v_0 = 0$   $0 = 25 - 4.9t^2$   $v = -22.14 \frac{\text{m}}{\text{s}}$   
 $v = ?$   $t = \sqrt{\frac{25}{4.9}} = 2.259 \text{ s}$   
 $x = 0$



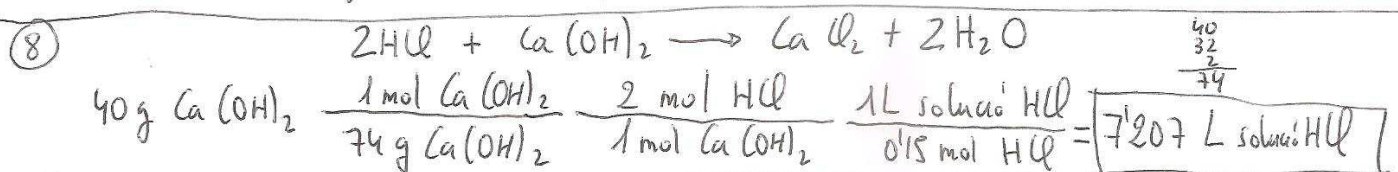
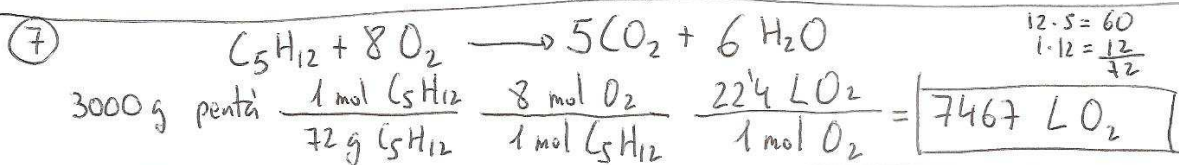
②  $m = 15 \text{ Kg}$   $x = x_0 + v_0(t-t_0) + \frac{1}{2}a(t-t_0)^2$   $F - F_f = m a$   
 $x = 6 \text{ m}$   $6 = 0 + 0(10-0) + \frac{1}{2}a(10-0)^2$   $F - 12 = 15 \cdot 0.12$   
 $t = 10 \text{ s}$   $6 = 50 a$   $F = 13.8 \text{ N}$   
 $F = ?$   $a = 0.12 \frac{\text{m}}{\text{s}^2}$

③  $P_j = 40 \text{ Kp} \cdot \frac{9.8 \text{ N}}{1 \text{ Kp}} = 392 \text{ N}$   $P_j = m g_j$   $P_v = G \frac{M_v \cdot m}{R_v^2}$   
 $g_j = 26 \frac{\text{m}}{\text{s}^2}$   $392 = m \cdot 26$   $P_v = 6.67 \cdot 10^{-11} \cdot \frac{4.87 \cdot 10^{24} \cdot 1508}{6.052 \cdot 1000^2} =$   
 $M_v = 4.87 \cdot 10^{24} \text{ Kg}$   $m = \frac{392}{26} = 15.08 \text{ Kg}$   $= 133.7 \text{ N}$   
 $R_v = 6.052 \text{ Km} = 6.052 \cdot 1000 \text{ m}$

④  $v = 0$   $\frac{1}{2}m v_0^2 + m g h_0 + W_{FF} = \frac{1}{2}m v^2 + m g h$   
 $h = ?$   $\frac{1}{2} \cdot 4 \cdot 20^2 + 5 \cdot h \cdot \cos 180^\circ = 4 \cdot 9.8 \cdot h$   
 $m = 4 \text{ Kg}$   $F_f = 5 \text{ N}$   $800 - 5h = 39.2h$   
 $h_0 = 0$   $800 = 44.2h$   $h = \frac{800}{44.2} = 18.10 \text{ m}$   
 $v_0 = 72 \frac{\text{Km}}{\text{h}} = 20 \frac{\text{m}}{\text{s}}$

⑤  $m_1 = 40 \text{ g}$   $T = ?$   $C_{e1} \cdot m_1 \cdot (T - T_{01}) + C_{e2} \cdot m_2 \cdot (T - T_{02}) = 0$   
 $T_{01} = 350^\circ \text{C}$   $0.093 \cdot 40 (T - 350) + 1 \cdot 2000 (T - 20) = 0$   
 $m_2 = 2 \text{ l H}_2\text{O} = 2000 \text{ g}$   $3.72T - 1302 + 2000T - 40000 = 0$   
 $T_{02} = 20^\circ \text{C}$   $2003.72T = 41302$   
 $C_{e1} = 0.093 \frac{\text{cal}}{\text{g} \cdot ^\circ \text{C}}$   $T = 20.61^\circ \text{C}$   
 $C_{e2} = 1 \frac{\text{cal}}{\text{g} \cdot ^\circ \text{C}}$

⑥  $i = 40^\circ$   $n_1 = 1$   $n_1 \cdot \sin i = n_2 \cdot \sin r$   
 $r = 35^\circ$   $1 \cdot \sin 40^\circ = n_2 \cdot \sin 35^\circ$   $v_2 = \frac{c}{n_2} = \frac{3 \cdot 10^8}{1.121} = 2676 \cdot 10^8 \frac{\text{m}}{\text{s}}$   
 $v_2 = ?$   $n_2 = \frac{\sin 40^\circ}{\sin 35^\circ} = 1.121$



⑨ Quan es conserva l'energia mecànica d'un cos?

⑩ Què és una ona mecànica?