


A compléter par approx. Exercices de synthèse n° 6 p 38. (1)

Travail - Puissance

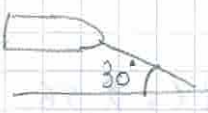
D	I	F	S
② $m = 850 \text{ kg}$ $h = 2,56 \text{ m}$ $\Delta t = 10 \text{ s}$ $g = 9,81 \text{ N/kg}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$ $W = F \cdot d$ $= m \cdot g \cdot h$	$W = 850 \cdot 9,81 \cdot 2,56$ $= 21346,56 \text{ J}$ $P = \frac{21346,56}{10} = 2134,6 \text{ W}$



③ $\theta = 30^\circ$ $d_{\text{câble}} = 600 \text{ m}$ $G = 500 \text{ N}$ $G_{\text{go}} = 90 \cdot 500 = 45000 \text{ N}$ $\Delta t = 1 \text{ h} = 3600 \text{ s}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$ $W = G \cdot \sin \theta \cdot d$	$W = 45000 \cdot \sin 30 \cdot 600$ $= 1,35 \cdot 10^7 \text{ J}$ $P = \frac{1,35 \cdot 10^7}{3600} = 3,75 \cdot 10^3 \text{ W}$ $= 3750 \text{ W}$
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④ $P = 25 \text{ kW} = 25 \cdot 10^3 \text{ W}$ $m = 1500 \text{ kg}$ $d = 3 \cdot 3 = 9 \text{ m}$ $g = 9,81 \text{ N/kg}$	$\Delta t = ?$ $W = ?$	$\Delta t = \frac{W}{P}$ $W = m \cdot g \cdot h$	$W = 1500 \cdot 9,81 \cdot 9 = 132435 \text{ J}$ $\Delta t = \frac{132435}{25 \cdot 10^3} = 52,97 \text{ s}$
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⑤ débit = $30 \cdot 10^6 \text{ m}^3/\text{h}$ $\rightarrow Q = 30 \cdot 10^6 \text{ m}^3$ $\Delta t = 1 \text{ h} = 3600 \text{ s}$ $h = 44 \text{ m}$ $V = 30 \cdot 10^9 \text{ L}$ car $1 \text{ m}^3 = 1000 \text{ L}$ $1 \text{ L pèse } 1 \text{ kg}$ $g = 9,81 \text{ N/kg}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$ $W = m \cdot g \cdot h$	$m = 30 \cdot 10^9 \text{ kg}$ $W = 30 \cdot 10^9 \cdot 9,81 \cdot 44 = 1,295 \cdot 10^{13} \text{ J}$ $P = \frac{1,295 \cdot 10^{13}}{3600} = 3,597 \cdot 10^9 \text{ W}$
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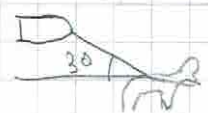


D	I	F	S
⑥ $F = 1000 \text{ N}$ F_k $d = 30^\circ$ $d = 1000 \text{ m}$ $\Delta t = 2 \text{ s}$	$W = ?$ $P = ?$	$W = F_H \cdot \cos 30^\circ \cdot d$ $P = \frac{W}{\Delta t}$	$W = 1000 \cdot \cos 30^\circ \cdot 1000$ $= 866025,4 \text{ J}$ $P = \frac{866025,4}{2}$ $= 433012,7 \text{ W}$

⑦ $F = 560 \text{ N}$ $v = 4,5 \text{ km/h}$ $d = 4500 \text{ m}$ $\Delta t = 3600 \text{ s}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$	$W = 560 \cdot 4500$ $= 2,52 \cdot 10^6 \text{ J}$ $P = \frac{2,52 \cdot 10^6}{3600} = 700 \text{ W}$
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⑧ $P = 3,7 \text{ kW}$ $= 3,7 \cdot 10^3 \text{ W}$ $V = 10 \text{ m}^3$ $h = 25 \text{ m}$ $V = 10000 \text{ L}$ $m = 10000 \text{ kg}$	$\Delta t = ?$ $W = ?$	$\Delta t = \frac{W}{P}$ $W = m \cdot g \cdot h$	$W = 10000 \cdot 9,81 \cdot 25$ $= 2,45 \cdot 10^6 \text{ J}$ $\Delta t = \frac{2,45 \cdot 10^6}{3,7 \cdot 10^3} = 6,63 \cdot 10^2 \text{ s}$ $= 663 \text{ s}$
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⑩ $F = 100 \text{ N}$ $m = 10000 \text{ kg}$ $\Delta t = 3600 \text{ s}$ $m = 4000 \text{ t}$ $= 4 \cdot 10^6 \text{ kg}$ $v = 60 \text{ km/h}$ $d = 60 \text{ km}$ $= 60000 \text{ m}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$ $W = \frac{m \cdot g \cdot d}{F}$	$W = 100 \cdot 4 \cdot 10^6 \cdot 60000$ $= 2,4 \cdot 10^{10} \text{ J}$ $P = \frac{2,4 \cdot 10^{10}}{3600} = 6,67 \cdot 10^6 \text{ W}$ $1 \text{ ch} = 735,5 \text{ W}$ $906,87 \text{ ch} \approx 6,67 \cdot 10^6 \text{ W}$ $\approx 9100 \text{ ch}$
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⑪ $d = 30^\circ$ $F = 3500 \text{ N}$ $d = 6000 \text{ m}$ $\Delta t = 3600 \text{ s}$ $v = 6 \text{ km/h}$	$P = ?$ $W = ?$	$P = \frac{W}{\Delta t}$ $W = F_H \cdot \cos 30^\circ \cdot d$	$W = 3500 \cdot \cos 30^\circ \cdot 6000$ $= 18186533 \text{ J}$ $P = 5051,81 \text{ W}$
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16) $d = 50 \text{ m}$
 $F = 10 \text{ N}$
 $\Delta t = 1,5 \text{ min} = 30 \text{ s}$
 $= 90 \text{ s}$
 $m = 3 \text{ kg}$

$W = ?$
 $P = ?$
 $v = ?$
 $W = E_c$

$W = F \cdot d$
 $P = \frac{W}{\Delta t}$
 $E_c = \frac{m \cdot v^2}{2}$
 $v = \sqrt{\frac{2 \cdot E_c}{m}}$

17) $W = 3 \cdot 9,81 \cdot 50$
 $= 1471,5 \text{ J}$
 $P = \frac{1471,5}{90} = 16,35 \text{ W}$
 $v = \sqrt{\frac{2 \cdot 1471,5}{3}} = \sqrt{981}$
 $= 31,32 \text{ m/s}$

18) $m = 5 \text{ T}$
 $= 5000 \text{ kg}$
 $v = 36 \text{ km/h}$
 $= 10 \text{ m/s}$
 $d = 10 \cdot 25$
 $= 250 \text{ m}$
 $\Delta t = 25 \text{ s}$

$P = ?$
 $W = ?$

$P = \frac{W}{\Delta t}$
 $W = m \cdot g \cdot d$

$W = 5000 \cdot 250 \cdot 9,81$
 $= 12262500 \text{ J}$
 $P = \frac{12262500}{25} = 490500 \text{ W}$

23) a) $F = 450 \text{ N}$
 $d = 9 \cdot 3 = 9 \text{ m}$
 b) $W = 4050$
 $F = 7500 \text{ N}$
 $F_f = 750 \text{ N}$

$W = ?$
 $d = ?$

$W = F \cdot d$
 $d = \frac{W}{F_f}$

$W = 450 \cdot 9$
 $= 4050 \text{ J}$
 $d = \frac{4050}{750} = 5,4 \text{ m}$

24) $h = 6 \text{ m}$
 debit = $24 \text{ m}^3/\text{min}$
 $V = 24 \text{ m}^3$
 $= 24000 \text{ L}$
 $m = 24000 \text{ kg}$
 $\Delta t = 60 \text{ s}$
 $g = 9,81 \text{ N/kg}$

$P = ?$
 $W = ?$

$P = \frac{W}{\Delta t}$
 $W = m \cdot g \cdot h$

$W = 24000 \cdot 9,81 \cdot 6$
 $= 1412640 \text{ J}$
 $P = \frac{1412640}{60} = 23544 \text{ W}$