Řešení 15. DÚ

1) $m = 400\,kg$
$s = 5\,m$
$t = 10\,s$
$W = ?\,J$
$P = ?\,W$

$W = F \cdot s$
$W = 4000 \cdot 5 = 20\,000\,J$

$P = \frac{W}{t}$
$P = \frac{20000}{10} = 2000\,W = 2\,kW$

Výkon byl 2 kW a práce 20 kJ.

2) $m = 30\,kg$
$F = 300\,N$
$s = 1{,}8\,m$
$t = 1\,s$
$P = ?\,W$

$P = \frac{F \cdot s}{t}$
$P = \frac{300 \cdot 1{,}8}{1}$
$P = 540\,W$

Jeho výkon byl 540 W

3) $m = 500\,kg$
$s = 12\,m$
$t = 1\,min = 60\,s$
$P = ?\,W$

$P = \frac{F \cdot s}{t}$
$P = \frac{5000 \cdot 12}{60} = 1000\,W$

Výkon jeřábu je 1 kW.

4) $m = 250\,kg + 100\,kg$
$s = 3\,m$
$t = 10\,s$
$F = 3500\,N$
$P = ?\,W$

$P = \frac{F \cdot s}{t}$
$P = \frac{3500 \cdot 3}{10} = 1050\,W$

Průměrný výkon je 1050 W

5) $P_B = 3680\,W$
$P_E = 4000\,W$

Větší je elektromotor

6) $m = 50\,kg$
$s = 10\,m$
$t = 15\,s$
$P = ?\,W$

$P = \frac{F \cdot s}{t}$
$P = \frac{500 \cdot 10}{15} = 333\,W$

7) $s = 4\,m$
$t_j = 8\,s$
$t_E = 16\,s.$
$W = ?\,J$
$m = 45\,kg$
$P_E = ?\,W$
$P_j = ?\,W$

$W = F \cdot s$
$W = 450 \cdot 4$
$W = 1800\,J$

$P_E = \frac{W}{t_E} = \frac{1800}{16} = 112{,}5\,W$

$P_j = \frac{W}{t_j} = \frac{1800}{8} = 225\,W$

8) $P_0 = 2000\,kW$
$P = 1800\,kW$
$\eta = ?$

$\eta = \frac{P}{P_0} = \frac{1800}{2000}$
$\eta = \frac{1800}{2000} = \frac{18}{20} = \frac{9}{10} = 90\,\%$

9) $P_0 = 30\,kW = 30\,000\,W$
$\eta = 80\,\% = 0{,}8$
$t = 1\,min = 60\,s$
$W = ?\,J$
$P = ?\,W$

$\eta \cdot P_0 = P$
$0{,}8 \cdot 30000 = 24000\,W$

$W = P \cdot t$
$W = 24000 \cdot 60$
$W = 1440\,kJ$

10) $P_0 = ?\,W$
$m = 3\,t = 3000\,kg$
$F = 30\,000\,N$
$s = 18\,m$
$t = 30\,s$
$\eta = 0{,}75$
$P = ?\,W$

10/ $m = 3t = 3000\,kg$

$F = 30\,000\,N$

$s = 18\,m$

$t = 30\,s$

$\eta = 75\%$

$P_0 = ?\,W$

$P = ?\,W$

$P = \frac{F \cdot s}{t}$

$P = \frac{30\,000 \cdot 18}{30} = 18000\,W$

$P_0 = \frac{P}{\eta} = \frac{18000}{0{,}75} = 24\,000\,W = 24\,kW$

Příkon motoru musí být 24 kW.

11/ $P = 6\,kW = 6000$

$m = ?\,kg$

$t = 1\,s$

$s = 0{,}5\,m$

$P = \frac{F \cdot s}{t}$

$6000 = \frac{F \cdot 0{,}5}{1}$

$\frac{6000}{0{,}5} = F$

$12000\,N = F$

$m = \frac{F}{g}$

$m = \frac{12\,000}{10}$

$m = 1200\,kg = 1{,}2\,t$

Těleso může mít hmotnost 1,2 t.