2.5 ELEKTRISK ARBEID OG ELEKTRISK EFFEKT

2.5.1

$$W = U \cdot I \cdot t = 230V \cdot 5A \cdot (1 \cdot 60(min) \cdot 60s) = \underline{4.14 \cdot 10^6 J = 4.14 MJ}$$

2.5.2

$$P = U \cdot I = 230V \cdot 12A = \underline{2760 W}$$

2.5.3

a) $P = \frac{U^2}{R} = \frac{110V^2}{5\Omega} = \underline{2420 W}$

b) $W = P \cdot t = 2420W \cdot 5 \cdot 60s = \underline{0,726 MJ}$

c) $W = P \cdot t = 2420 W \cdot (1 \cdot 60 \cdot 60s + 30 \cdot 60s) = \underline{13,07 MJ}$

2.5.4

a) $P = I^2 \cdot R = 5A^2 \cdot 70\Omega = \underline{1875 W}$

b) $W = P \cdot t = 1875W \cdot 70 \cdot 60s = \underline{7875 kJ}$

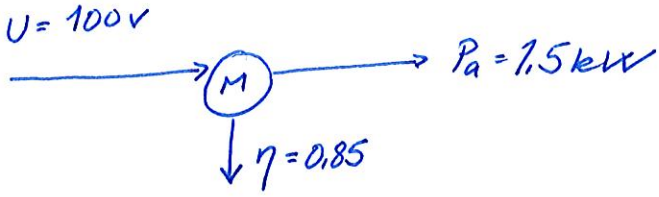
2.5.5

$Q = I \cdot t \qquad I = \frac{Q}{t} = \frac{500C}{15s} = \underline{33,3 A}$

$P = I^2 \cdot R = 33,3A \cdot 25\Omega = \underline{833,3 W}$

$W = P \cdot t = 833,3W \cdot 15s = \underline{12,5 kJ}$

2.5.6

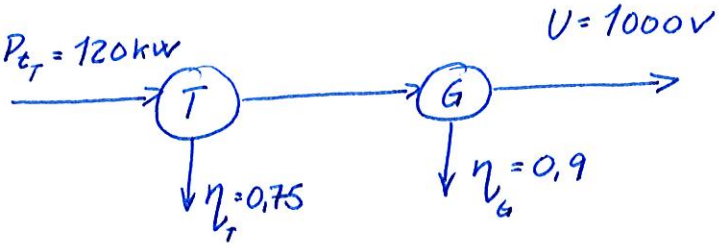


a) $P_t = \frac{P_a}{\eta} = \frac{1,5 \cdot 10^3 W}{0,85} = \underline{1765\ W}$

b) $W = P_t \cdot t = 1765\ W \cdot 8 \cdot 60 \cdot 60_s = \underline{50,8\ MJ}$

c) ~~$P = U^2$~~

2.5.7



a) AVGITT EFFEKT TURBIN

$P_{a_T} = P_{t_T} \cdot \eta_T = 120 \cdot 10^3 W \cdot 0,75 = \underline{90\ kW}$

AVGITT EFFEKT GENERATOR

$P_{a_T} = P_{t_G} = \underline{90kW}$

$P_{a_G} = P_{t_G} \cdot \eta_G = 90 \cdot 10^3 W \cdot 0,9 = \underline{81\ kW}$

b)

$W_{a_G} = P_{a_G} \cdot t = 81 \cdot 10^3 W \cdot (24(t) \cdot 60(min) \cdot 60_s) = \underline{7,0 \cdot 10^9\ J}$

$W_{a_T} = P_{a_T} \cdot t = 90 \cdot 10^3 W \cdot (24(t) \cdot 60(min) \cdot 60_s) = \underline{7,78 \cdot 10^9\ J}$

2.5.8

$V = 200\ \ell$

$\eta = 0{,}87$

$U = 230\,V$

$t_1 = 20\,°C$

$t_2 = 90\,°C$

$T_{id} = 4$ timer $= 14400\,s$

$w = 4{,}19\,kJ$ 1 ℓ vann 1°

a) $P = \dfrac{w \cdot V \cdot (t_2 - t_1)}{\eta \cdot t} =$

$= \dfrac{4{,}19 \cdot 10^3\,J \cdot 200\,\ell \cdot (90°C - 20°C)}{0{,}87 \cdot 14400\,s} = \underline{4682{,}3\,W}$

$= \underline{\underline{4{,}68\,kW}}$

b) $W = P \cdot t = 4682{,}3\,W \cdot 14400\,s = \underline{\underline{67{,}4\,MJ}}$

c) $P_{pris} = P \cdot t \cdot 0{,}47\,kr = 4{,}68\ kW \cdot 4\,h \cdot 0{,}47\,kr = \underline{\underline{8{,}80\,kr}}$