



SÈRIE 5

Exercici 1

Q1 d

Q2 a

Q3 c

Q4 a

Q5 d

Exercici 2

a)

v	g	r	a
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

b)

$$a = (\bar{v} \cdot \bar{g} \cdot \bar{r}) + (\bar{v} \cdot g \cdot r) + (v \cdot \bar{g} \cdot r) + (v \cdot g \cdot r)$$

o també

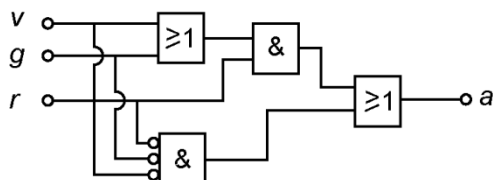
$$a = (v + g + \bar{r}) \cdot (v + \bar{g} + r) \cdot (\bar{v} + g + r) \cdot (\bar{v} + \bar{g} + r)$$

simplificant:

$$a = r(v + g) + \bar{v} \cdot \bar{g} \cdot \bar{r}$$

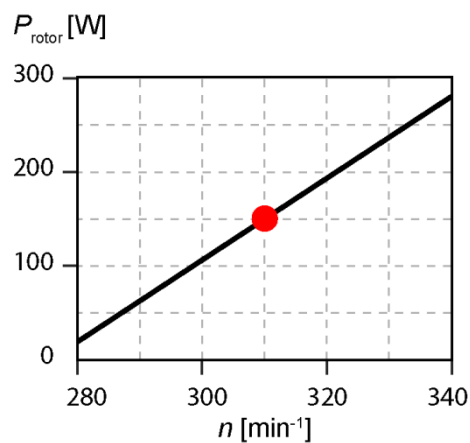
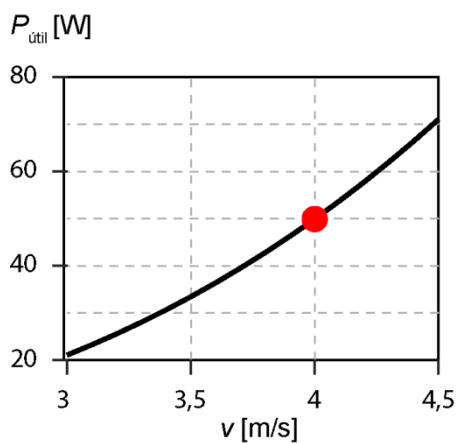


c)



Exercici 3

a)



del gràfic $P_{\text{útil}} = 50 \text{ W}$

$$P_{\text{rot}} = \frac{P_{\text{útil}}}{\eta} = 150 \text{ W}$$

b)

$$P_{\text{rot}} = 150 \text{ W} \rightarrow \text{del gràfic } n = 310 \text{ min}^{-1} \rightarrow \omega = n \frac{2\pi}{60} = 32,46 \text{ rad/s}$$

$$\Gamma = \frac{P_{\text{rot}}}{\omega} = 4,621 \text{ Nm}$$

c)

$$E_{\text{subm}} = P_{\text{útil}} t = 175 \text{ kW} \cdot \text{h} = 630,0 \text{ MJ}$$



d)

$$q = \frac{E_{\text{casa}}}{E_{\text{subm}}} = 2,857 \text{ aerogeneradors} \rightarrow 3 \text{ aerogeneradors}$$



Exercici 4

a)

$$E_{\text{cons}} = m_b p; \rightarrow \eta = \frac{E_{\text{útil}}}{E_{\text{cons}}} = \frac{m_b p}{E_{\text{cons}}} = 0,6$$

b)

$$m_a = \frac{E_{\text{útil}}}{c_e \Delta T} = 2,067 \cdot 10^6 \text{ kg}$$

c)

$$t = 24 \frac{\text{h}}{\text{dia}} \cdot 3600 \frac{\text{s}}{\text{h}}; \rightarrow q = \frac{m}{\rho t} = 23,92 \text{ L/s}$$

Exercici 5

a)

$$E_{\text{subm}} = \eta_{\text{gasoil}} \rho_{\text{gasoil}} V_{\text{gasoil}} = 33,89 \cdot 10^3 \text{ MJ} = 9,414 \text{ MW} \cdot \text{h}$$

b)

$$E_{\text{cons_GN}} = \frac{E_{\text{subm}}}{\eta_{\text{GN}}} = 36,05 \cdot 10^3 \text{ MJ} = 10,02 \text{ MW} \cdot \text{h}$$

$$V_{\text{GN}} = \frac{E_{\text{cons_GN}}}{\rho_{\text{GN}}} = 856,0 \text{ m}^3$$

c)

$$\Delta m_{\text{CO}_2} = F E_{\text{gasoil}} V_{\text{gasoil}} - F E_{\text{GN}} E_{\text{cons_GN}} = 756,9 \text{ kg}$$



Exercici 6

a)

$$\alpha = \arctan(10/100) = 5,711^\circ;$$

$$P_{\text{mec}} = \frac{m g v \sin(\alpha)}{2} = 130,1 \text{ W}$$

b)

$$\omega = \frac{v}{d/2}; \rightarrow \Gamma = \frac{P_{\text{mec}}}{\omega} = 17,56 \text{ Nm}$$

d)

$$P_{\text{cons}} = \frac{2 P_{\text{mec}}}{\eta} = 329,4 \text{ W}$$