Question 1

1)

2) $100 = \frac{2V\sqrt{2}}{\pi}$

$V = 177.71\,V$

3) $V_1/V_2 = 240/177.71$

$a = 1,3505$

5) $V_{eff} = 3A$

6) $S = 3 \cdot 177.71 = 533,13\,W$

7) $201.75 = \frac{V \cdot \sqrt{2}}{\pi}(1 + \cos(30))$

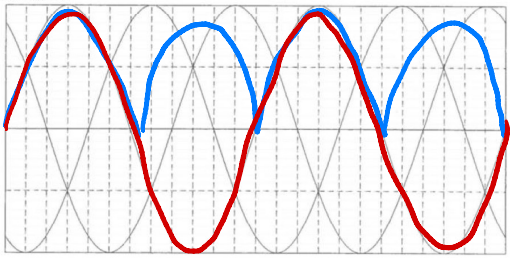
$V = 240,17$

8) $240/240,17$

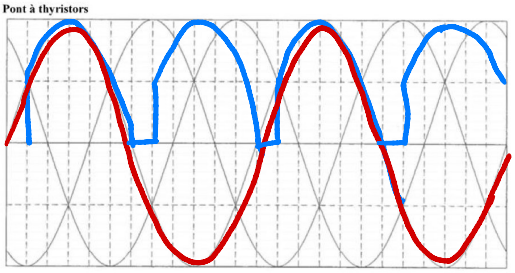
$a = 0,999929168$

10)

4)

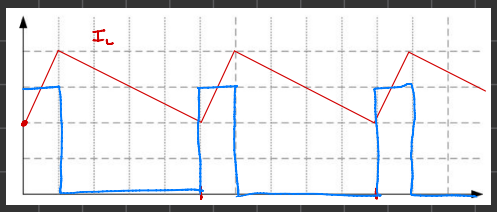


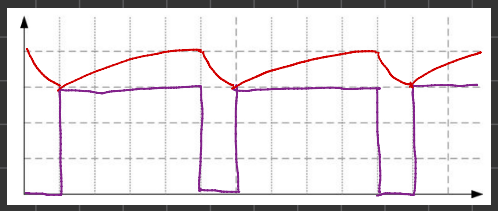
9)



Question 2:

1)





2) $V_s = -\frac{\alpha V_e}{(1-\alpha)}$ $\quad I = \frac{-\alpha V_e}{R \cdot (1-\alpha)}$

$V_s = V_c \quad V_e = E$ $\quad I = \frac{\alpha E}{R \cdot (1-\alpha)}$

$\frac{V_c}{E} = \frac{\alpha}{(1-\alpha)}$

3) $V_3 = \frac{0.2 \cdot 24}{(1-0.2)}$ $\quad \Delta I_L = \frac{24 \cdot 0.2}{30 \cdot 10^{-6} \cdot 100 \cdot 10^{3}}$

$< V_{C2} = 6\,V$ $\quad \Delta I_L = 1.6\,A \rightarrow V_{crête-crête}$

4) $P_{sw\ cond} = R_{DSon} \cdot I_{eff}^2$

$110 \cdot 10^{-3} \cdot 3^2$

$= 0.99$

$W_{com} = \frac{1}{2} V \cdot I \cdot (t_{on} + t_{off})$

$= \frac{1}{2} \cdot 24 \cdot 3 (500 \cdot 10^{-9})$

$= 18\,\mu$

$P_{com} = f \cdot W_{com}$

$= 1,8\,W$

b) $P_{cond} \times V_f \cdot I_{d\ moyen}$

I_d moyen $= 3.08$ car 80% du temps elle conduit pas

$= 24$

$P_{cond} = 0.7 \cdot 24$

$= 1.68\,W$

c) $T_j - T_a = R_{th} \cdot P_{th}$

$85 - 15 = R_{th} \cdot (0.99 + 1.8)$

$25.08\,°C/W = R_{th}$