

Examen 7/1/02 ETIS/ETIG

PRIMER BLOC

$$① E_x = E_{ph} - E_{dix} = \frac{\sigma}{2\epsilon_0} - \frac{\sigma}{2\epsilon_0} \left(1 - \frac{x}{\sqrt{R^2 + x^2}}\right) = \frac{\sigma}{2\epsilon_0} \frac{x}{\sqrt{R^2 + x^2}} = 35,3 \text{ mV/m}$$

$$② a) \text{ (I)} \quad I = \frac{11,3 - 9,8}{1000 + 560 + 2200} = 399 \mu\text{A} \quad V_A - V_D = 9,8 + 2200 \cdot 399 \cdot 10^{-6} = 10,68 \text{ V}$$

$$b) \begin{array}{|c|} \hline \uparrow I_1 \\ \hline \uparrow I_2 \\ \hline \uparrow I_3 \\ \hline \end{array} \quad \left. \begin{array}{l} I_1 + I_2 + I_3 = 0 \\ 11,3 - 1560 I_1 + 2200 I_2 - 9,8 = 0 \\ 9,8 - 2200 I_2 + 10000 I_3 = 0 \end{array} \right\} \Rightarrow \begin{array}{l} I_3 = -978 \mu\text{A} \\ V_A - V_B = -10000 I_3 = 9,78 \text{ V} \end{array}$$

SECON BLOC

$$④ a) \mathcal{E} = -N \frac{d\phi}{dt} = -NA \frac{dB}{dt} = -NA \mu \frac{N}{l} \frac{dI}{dt} \Rightarrow L = \mu \frac{N^2}{l} A = 2,26 \text{ H}$$

$$b) I_0 = \frac{10 \text{ V}}{10 \Omega} = 1 \text{ A} \quad \mathcal{E} = 560 \cdot 1 = 560 \text{ V}$$

$$c) I(t) = I_0 e^{-t/\tau} \quad \tau = \frac{L}{R} = \frac{2,26}{560} = 4,04 \text{ ms}$$

$$\text{si } I(t) = \frac{I_0}{2} \Rightarrow t = -\tau \ln 0,5 = 2,8 \text{ ms}$$

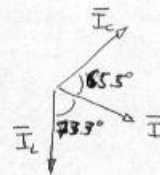
$$⑤ \bar{X}_C = -\frac{j}{\omega C} = -79,6 j \Omega = 79,6 \angle -90^\circ \Omega$$

$$\bar{X}_L = j\omega L = 62,8 j \Omega \Rightarrow \bar{Z}_{LK} = R + \bar{X}_L = 57 + 62,8 j = 83,5 \angle 48,8^\circ \Omega$$

$$\bar{I}_L = \frac{\bar{V}}{\bar{Z}_{LK}} = \frac{100 \angle 0}{83,5 \angle 48,8} = 1,20 \angle -48,8^\circ \text{ A} = (0,79 - 0,90 j) \text{ A}$$

$$\bar{I}_C = \frac{\bar{V}}{\bar{X}_C} = \frac{100 \angle 0}{79,6 \angle -90} = 1,26 \angle 90^\circ \text{ A} = 1,26 j \text{ A}$$

$$\bar{I} = \bar{I}_L + \bar{I}_C = (0,79 + 0,36 j) \text{ A} = 0,87 \angle 24,5^\circ \text{ A}$$



PRATIQUE

$$\tau = -\frac{1}{\text{pente}} = -\frac{1}{-2,5 \text{ ms}^{-1}} = 0,4 \text{ ms}$$