

SERIE 2 : LOI D'OHM..... CORRIGES

EXERCICE 1 :

$$U = R \cdot I \Rightarrow I_{Tot} = \frac{U}{R_{Tot}} = \frac{24}{119} = 0.201A$$

$$U_1 = R_1 \cdot I = 13 \cdot 0.201 = 2.62V$$

$$U_2 = R_2 \cdot I = 16 \cdot 0.201 = 3.216V$$

$$U_3 = R_3 \cdot I = 90 \cdot 0.201 = 18.09V$$

EXERCICE 2 :

$$I_2 = I_{Tot} = \frac{U_2}{R_2} = \frac{12}{6} = 2A$$

$$U_3 = R_3 \cdot I = 122 \cdot 2 = 244V$$

$$U_1 = R_1 \cdot I = 4 \cdot 2 = 8V$$

$$U_{Tot} = U_1 + U_2 + U_3 = 8 + 12 + 244 = 264V$$

EXERCICE 3 :

$$\Delta U = U_2 - U_1 = 18V \rightarrow I = \frac{12}{500} = 0.024A \rightarrow R_a = \frac{\Delta U}{I} = \frac{18}{0.024} = 750\Omega$$

EXERCICE 4 :

$$R_1 + R_2 = R_{12} = 3\Omega \Rightarrow R_{12} \parallel R_3 = R_{123} = \frac{R_3}{2} = 1.5\Omega \Rightarrow R_{123} + R_4 = R_{Tot} = 5.5\Omega$$

$$I_{Tot} = \frac{U}{R_{Tot}} = 8.72A$$

$$U_4 = R_4 \cdot I_{Tot} = 34.88V \Rightarrow U_3 = U - U_4 = 13.12V$$

$$I_{Tot} = I_4 = 8.72A \Rightarrow I_3 = \frac{U_3}{R_3} = \frac{13.12}{3} = 4.37A \Rightarrow I_1 = I_2 = I_{Tot} - I_3 = 8.72 - 4.37 = 4.35A$$

$$U_1 = R_1 \cdot I_1 = 1 \cdot 4.35 = 4.35V \Rightarrow U_2 = U_3 - U_1 = 13.12 - 4.35 = 8.77V$$

EXERCICE 5 :

$$R_1 \parallel R_2 = R_{12} = R = \frac{R_1 \cdot R_2}{R_1 + R_2} = 6.96\Omega \Rightarrow R_{12} + R_3 + R_4 = R_{1234} = 108.96\Omega$$

$$R_{Tot} = R_{1234} \parallel R_5 = \frac{R_{1234} \cdot R_5}{R_{1234} + R_5} = 35.20\Omega$$

$$I_{Tot} = \frac{U}{R_{Tot}} = 6.53A$$

$$U_5 = 230V \Rightarrow I_5 = \frac{U_5}{R_5} = 4.42A \Rightarrow I_3 = I_4 = I_{Tot} - I_5 = 2.11A$$

$$U_3 = R_3 \cdot I_3 = 211V \Rightarrow U_4 = R_4 \cdot I_4 = 4.22V \Rightarrow U_1 = U_2 = U_{Tot} - (U_3 + U_4) = 14.78V$$

$$I_1 = \frac{U_1}{R_1} = \frac{14.78}{15} = 0.985A \Rightarrow I_2 = \frac{U_2}{R_2} = \frac{14.78}{13} = 1.136A$$

EXERCICE 6 :

a)

$$I = \frac{U}{R_1 + R_2} = \frac{15}{450} = 0.033A$$

$$U_1 = R_1 \cdot I = 330 \cdot 0.033 = 11V$$

$$U_2 = R_2 \cdot I = 120 \cdot 0.033 = 4V$$

b)

$$R_2 \parallel R_R = \frac{R_2 \cdot R_R}{R_2 + R_R} = 54.54\Omega$$

$$R_{Tot} = 330 + 54.54 = 384.54\Omega$$

$$I = \frac{U}{R_1 + R_2} = \frac{15}{384.54} = 0.039A$$

$$U_1 = R_1 \cdot I = 330 \cdot 0.039 = 12.87V$$

$$U_2 = R_2 \cdot I = 54.54 \cdot 0.39 = 2.12V$$