Corrigé type du Matière Mesure Electrique et Electronique L2 GE (Telecom, Auto , Elect]

Exercice 1 (12pts)

	I_1	I_2	U=V
$x = \frac{lecture\,.\,calibre}{echelle}$	$I_1 = \frac{15.3}{30} = 1{,}5$ A	$I_2 = \frac{40.5}{100} = 2$ A	$U = \frac{100.150}{150} = 100$ V
$\Delta x = \frac{C}{100}.Cal + \frac{1}{4}.\frac{Cal}{N}$	ΔI_1=0,055 A	ΔI_2=0,088 A	ΔU=2,5 V

0.25 x 6 =1.5

1. $I = I_1 + I_2 \rightarrow I = (I_1 + I_2) + (\Delta I_1 + \Delta I_2) \rightarrow I = 3{,}5 \pm 0{,}143$ A 1

2. $U = R_{eq}.I = R_{eq}.(I_1 + I_2) \Longrightarrow R_{eq} = \frac{U}{(I_1+I_2)}$ 0.5

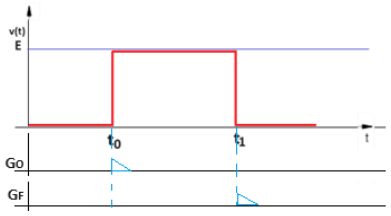
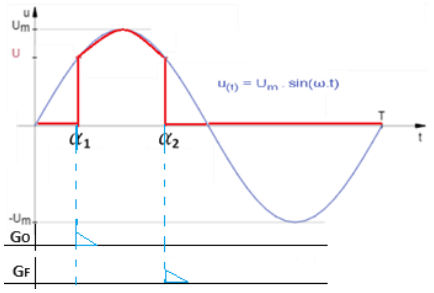
3. $R_{eq} = \frac{U}{(I_1+I_2)} = \frac{100}{1{,}5+2} = 28{,}57\ \Omega$

$\frac{\Delta R_{eq}}{R_{eq}} = \frac{\Delta U}{U} + \frac{\Delta I_1}{(I_1+I_2)} + \frac{\Delta I_2}{(I_1+I_2)} = 0{,}066 = 6{,}6\%$ 1

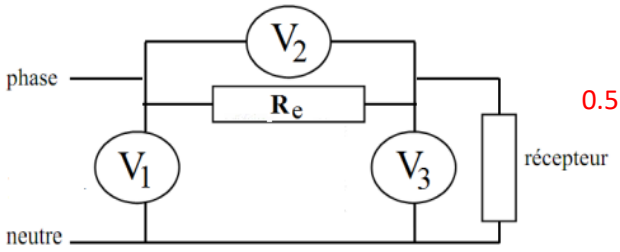
$\Delta R_{eq} = R_{eq} * 0{,}066 = 1{,}88\ \Omega$ 0.5

$\Delta R_{eq} = 28{,}57 \pm 1{,}88\ \Omega = 22{,}2\ \Omega \pm 6{,}6\%$ 1

* La valeur moyenne et la valeur efficace

4. la valeur moyenne	5. la valeur efficace
0.5 	0.5 
$\langle v\rangle = \frac{1}{T}\int_0^T v(t)dt = \frac{1}{T}\int_{t_0}^{t_1} E.dt = \frac{E}{T}\{t_1 - t_0\}$ 1	$V = \sqrt{\frac{1}{2\pi}\int_0^{2\pi} {U_m}^2.sin\theta^2 d\theta} = \sqrt{\frac{1}{2\pi}\int_{\alpha_1}^{\alpha_2} {U_m}^2.\frac{1}{2}(1-cos2\theta)d\theta}$ $= \frac{U_m}{2}\sqrt{\frac{1}{\pi}\left[\alpha_2 - \alpha_1 - \frac{1}{2}(sin2\alpha_2 - sin2\alpha_1)\right]}$ 1

6. Mesure de la puissance



0.5

$$\begin{cases} p = v_3\frac{v_2}{R_e} \\ v_1 = v_2 + v_3 \end{cases} \quad v_1^2 = (v_2+v_3)^2 \Longrightarrow p = \frac{1}{2R_e}(v_1^2 - v_2^2 - v_3^2) \Longrightarrow \boxed{P = \frac{1}{2R_e}(V_1^2 - V_2^2 - V_3^2)}$$ 0.5

$$\frac{\Delta P}{P} = \frac{\Delta R_e}{R_e} + \frac{2V_1^2}{|V_1^2 - V_2^2 - V_3^2|}\frac{\Delta V_1}{V_1} + \frac{2V_2^2}{|V_1^2 - V_2^2 - V_3^2|}\frac{\Delta V_2}{V_2} + \frac{2V_3^2}{|V_1^2 - V_2^2 - V_3^2|}\frac{\Delta V_3}{V_3}$$ 1

- **Unit SI et équation à la dimension du puissance P**

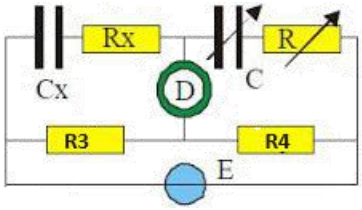
Grandeur	Unit	7. Unité SI	8. Equation aux dimensions
Tension	1 watt	1 W = 1 $kg.m^2.s^{-3}$ 1	Dim P= [P]= ML^2T^{-3} 1

Exercice 2 (03pts)

Appareil	Continue	Rupture / Isolation
	Petit valeur	Grand valeur (MΩ)
	Son	Pas de Son
	Petit valeur	1

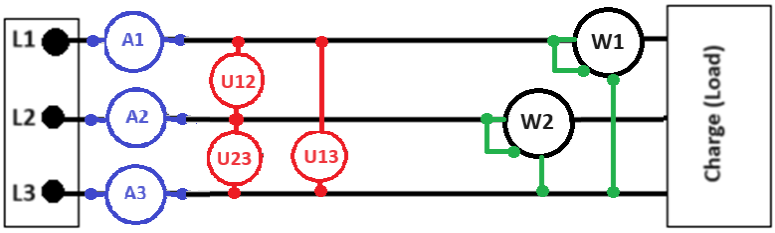
0.5 x 6= 3

Exercice 3 (02pts) **:** les résultats équivalents pour chaque appareil de mesure

Montage du pont de **Sauty**	À l'équilibre du pont (Rx, Cx).
0.5 	$Rx = R\frac{R_3}{R_4}$ 0.5 $et\ \ Cx = C.\frac{R_4}{R_3}$ 0.5
$Z_x.Z_4 = Z.Z_3 \Rightarrow R_xR_4 - j\frac{R_4}{wC_x} = RR_3 - J\frac{R_3}{wC}$ 0.5	

Exercice 4 (03pts) **:**

0.25 x 8 =2



P = $W_1 + W_2$ 0.5

Q = $\sqrt{3}\,(W_1 - W_2)$ 0.5

Remarque : la tension V est incorrecte car il n'existe pas de phase et de neutre.