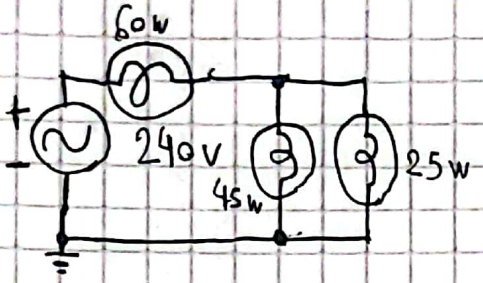
1-



A) 60w + 45w + 25w

130w

B) $V_{AR} = 0w$

$V_A = \sqrt{W^2 + VAR^2}$

$V_A = \sqrt{130^2}$

$V_A = 130$

C) $\frac{130w}{240v} = 542mA$

D) $\frac{60w}{542mA} = 110,77V$ $\quad \frac{110,77V}{542mA} = 204,37\Omega$

$204,37\Omega$

E)

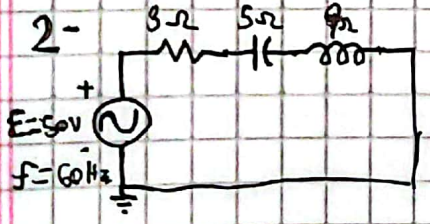
$240_v - 110,77v = 129,23V$

$45w = 129,23v \cdot I_1$ $\quad 25w = 129,23v \cdot I_2$

$I_1 = \frac{45w}{129,23V} = 348mA$ $\quad I_2 = \frac{25w}{129,23V} = 193mA$

$\frac{129,23V}{348mA} = 371,12\Omega$ $\quad \frac{129,23V}{193mA} = 668\Omega$

2-



$Z_T = 3\Omega + j(9\Omega - 5\Omega)$

$Z_T = 5\Omega e^{j53,13°}$

$I_T = \frac{50V}{5\Omega e^{j53,13}} = 10A$

C) $P_{A\,res} = 300VA$, $P_{A\,cap} = 500VA$, $P_{A\,ind} = 900VA$ $\Big\}$ $S_T = \sqrt{P_T^2 + Q_T^2}$

A) $P_R = 10A^2 \cdot 3\Omega = 300w$ → potencia aparente

b) $P_{A\,cap} = 10A^2 \cdot 5\Omega = 500VAR$ → potencia reactiva

$P_{A\,ind} = 10A^2 \cdot 9\Omega = 900VAR$

$Q_T = P_{A\,ind} - P_{A\,cap}$

$Q_T = 900VAR - 500VAR = 400VAR$

D) $W_T = 300w = P_T$

$VAR_T = 400VAR = Q_T$

$VA_T = 600VA = S_T$

$F_p = \frac{300w}{500VA} = 0,6$

d) $S_T = \sqrt{P_T^2 + Q_T^2}$

calculo Volts-ampere $S_T = \sqrt{300w^2 + 400VAR^2} = 500VA$

Energía resistor ↑ potencia resistor

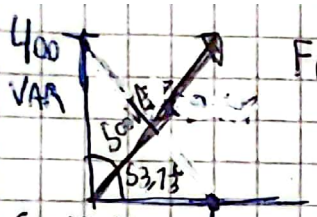
$E_R = P \cdot t$

$1\,ciclo = \frac{1}{F}$

Factor de potencia

$\frac{W}{VA} = F_p$

$P_T = P_A +$ sumatoria de potencias aparentes o promedio activa

E) 

$Fp = \frac{PT}{ST}$

$\cos^{-1}(Fp) = \theta = 53,13$

$FP = \frac{300W}{500VA} = 0,6$

F) $300w \cdot \frac{1}{60Hz} = ER = 5\Omega$

$\frac{1}{60Hz} = 0,016$

↗ Energía del capacitor

$Exc = C \cdot \frac{V^2}{2}$

g) $W = 2 \cdot \pi \cdot 60Hz = 376,99$ rad/s

$C = \frac{1}{w \cdot 5_\Omega} = 530\mu F$

$Rc = \frac{1}{w \cdot C}$

$Exc = 530\mu F \cdot \frac{50V^2}{2} = 0,66J$

$w = 2 \cdot \pi \cdot F$

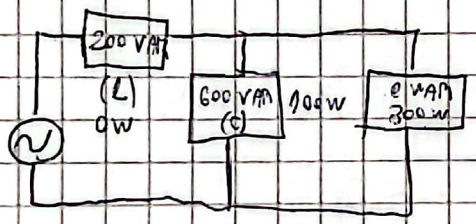
$EXL = L \cdot \frac{I^2}{2}$

$RL = w \cdot L$

$L = \frac{RL}{w} = 23,87mH$

$EXL = 23,87mH \cdot \frac{10A^2}{2} = 1,19J$

3- A)

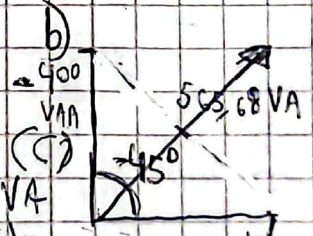


$E = 100V \angle 90°$

A) $PT = 300w + 100w = 400w$

$QT = 200VAR - 600VAR = -400VAR$

$ST = \sqrt{400w^2 + 400VAR^2} = \sqrt{320000} = 565,68VA$



Factor de potencia ↑

$FP = \frac{400w}{\sqrt{320000}} = 0,7$

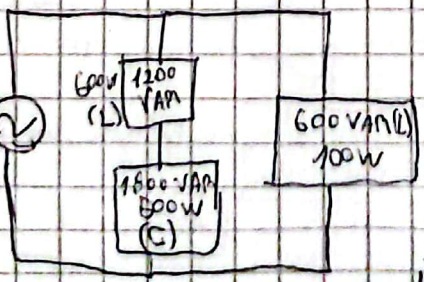
$\theta = \cos^{-1}(FP) = -45°$

C) 

$If = \frac{ST}{V} = \frac{\sqrt{320000}\ -45°}{100V\ 90°} = 5,66e^{j-135}$

se dividen → se restan los ángulos

4-



A) $PT = 600w + 500w + 100w = 1200w$

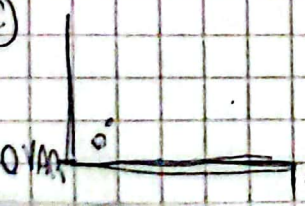
$QT = 1200VAR + 600VAR - 1800VAR = 0VAR$

$ST = \sqrt{1200^2} = 1200VA$

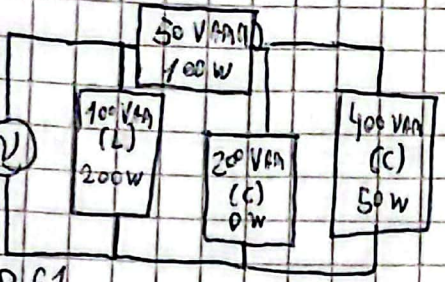
b) $= \frac{PT}{ST} = \frac{1200w}{1200VA} = 1 = FP$

d) $FP = \frac{1200w}{200V} =$

d) $If = \frac{ST}{V} = \frac{1200\ 0°}{200V\ 0°} = 6e^{j0}$



5-



$E = 50V \angle 60°$

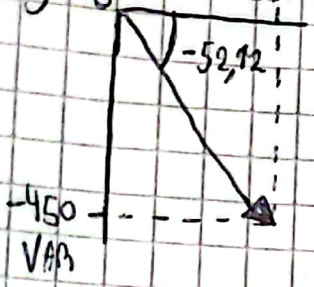
A) $PT = 200w + 100w + 50w = 350w$

$QT = 50VAM + 100VAM - 200VAM - 400VAM$
$= -450VAM$ (E)

$ST = \sqrt{350w^2 + 450VAM^2} = 570VA$

b) $FP = \frac{PT}{ST} = \frac{350w}{570VA} = 0,61$

c)



$\theta = \cos^{-1} FP = 52,12$

d) $IF = \frac{ST}{V} = \frac{570VA\, e^{j-52,12}}{50V e^{j60}} = 11,4A e^{j-112,12}$

6-

A) $PT = \frac{V^2}{20\Omega} = 180w$

potencia promedio

b) $PXL = 0$ es inductor

c) $PT = 180w + 400w = 580w$

$QT = 600VAM + 360VAM = 960VAM$ potencia reactiva

$QR = 0$ es resistor

$QXL = \frac{V^2}{10\Omega} = 360VAM$

$ST = \sqrt{580w^2 + 960VAM^2} = 1121,6$ potencia aparente

$SR = \sqrt{180w^2} = 180VA$

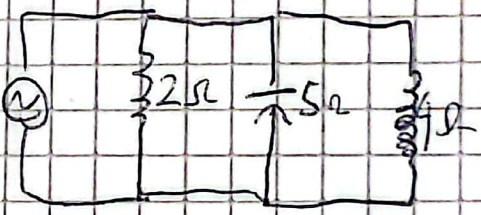
$SXL = \sqrt{360^2} = 360VA$

$FP = \frac{PT}{ST} = 0,52$

$\theta = \cos^{-1} FP = 58,86$

d) $I = \frac{ST}{V} = \frac{1121,6 e^{j58,86°}}{60V e^{j30°}} = 18,7 e^{j28,86}$

7-



A) $PR = \frac{V^2}{2\Omega} = 200w$

b) $QR = 0VAM$ es resistor

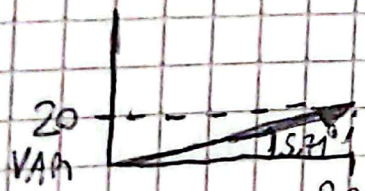
$PC = \frac{V^2}{5\Omega} = 80mw$ es capacitor

$QC = \frac{V^2}{5\Omega} = 80VAM$

$PL = \frac{V^2}{4\Omega} = 100w$ es inductor

$QL = \frac{V^2}{4\Omega} = 100VAM$

E) $\theta = \cos^{-1}(FP) = 5,71°$



c) $SR = 200VA$

$SC = 80VA$

$SL = 100VA$

d) $PT = 200w$

$QT = 100VAR - 80VAM = 20VAM$

$ST = \sqrt{200w^2 + 20VAM^2} = 201VA$

$FP = \frac{PT}{ST} = 1 = \frac{200}{201}$

F) $IA = \frac{ST}{V} = \frac{201VA e^{j5,71}}{20V e^{j0°}}$

$= 10,05 e^{j5,71}$