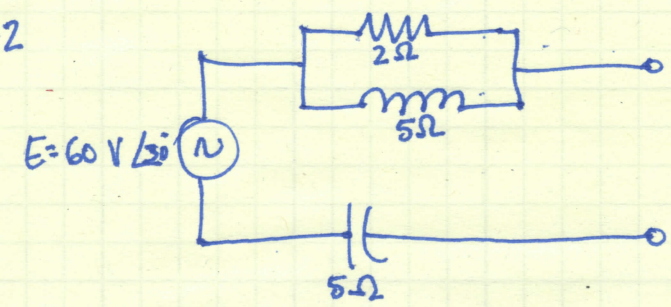
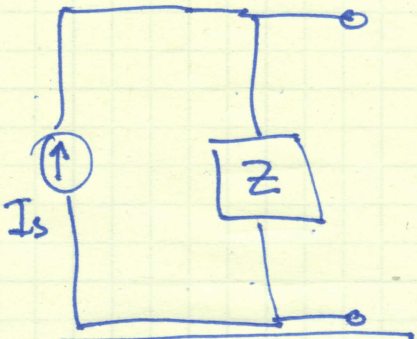
HW #23

17-2

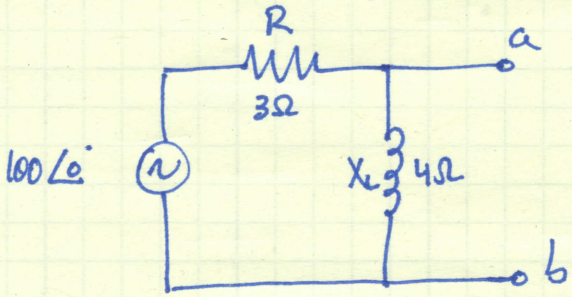




$$Z = (Z_R \parallel Z_L) + Z_C = (2 \parallel 5j) + (-5j) = \boxed{4{,}64\ \Omega\ \angle -68{,}2° = Z}$$

$$I_S = \frac{E}{Z} = \frac{60\ \angle 30°}{4{,}64\ \angle -68{,}2} = \boxed{12{,}93\ \angle +98{,}2\ A = I_S}$$

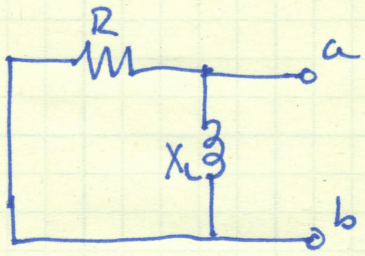
18-13



~~$Z_{TH} = Z_R \parallel Z_L = 3\angle 0 \parallel 4\angle 90$~~

~~$E_{TH} =$~~

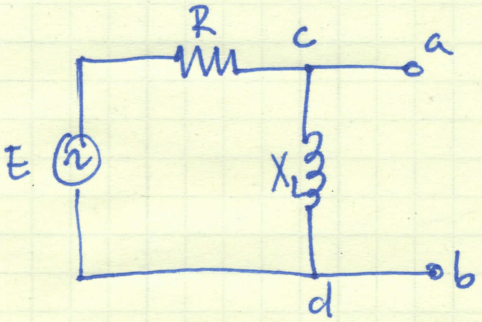
Z_{TH}



$$Z_{TH} = Z_R \parallel Z_L = 3\angle 0 \parallel 4\angle 90 =$$

$$Z_{TH} = 2{,}4\ \angle 36{,}8 = 1{,}92 + j\ 1{,}44$$

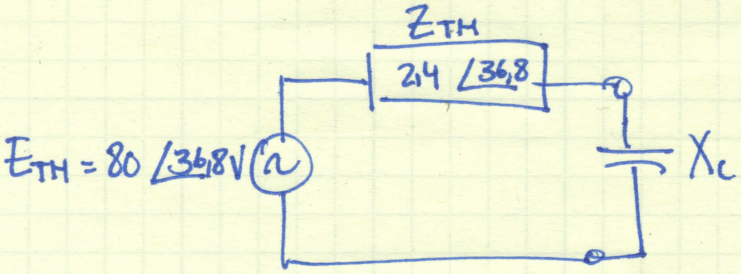
E_{TH}



$$E_{TH} = V_{ab} = V_{cd}$$

$$V_{cd} = E \cdot \frac{Z_L}{Z_R + Z_L} = 100\angle 0 \cdot \frac{4\angle 90}{3+4j}$$

$$V_{cd} = 80\ \angle 36{,}8\ V = E_{TH}$$



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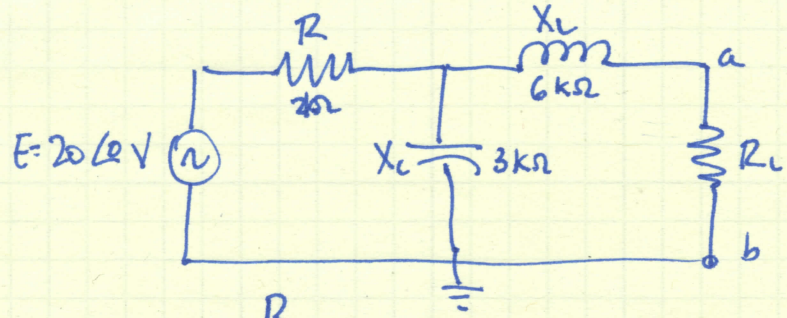
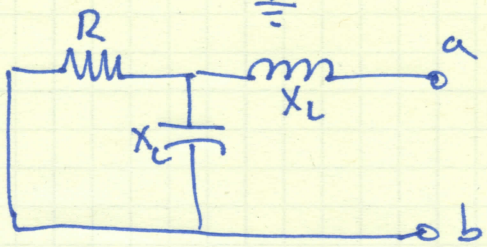
19-14



Z_{TH}

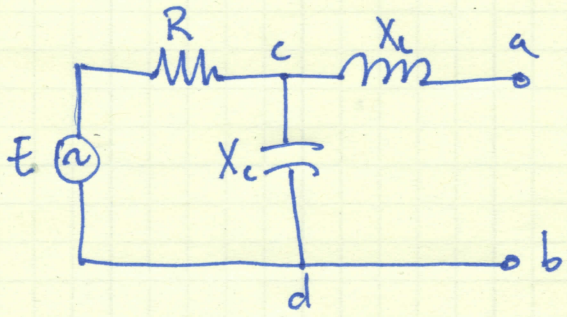


$Z_{TH} = ZX_L + (ZR \,||\, ZX_C)$

$Z_{TH} = 6\angle 90 + (2\angle 0 \,||\, 3\angle 90)$

$Z_{TH} = 5{,}26 \angle \underline{74{,}7}^{\circ}\ k\Omega$

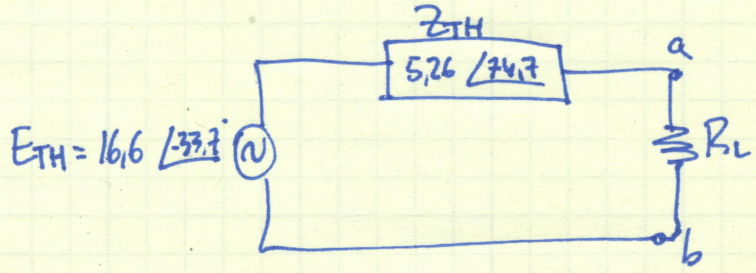
E_{TH}



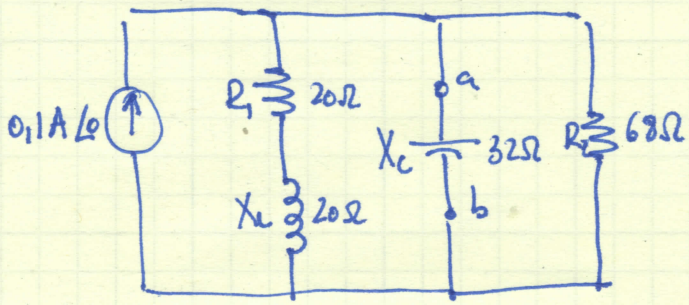
$E_{TH} = V_{ab} = V_{cd}$

$V_{cd} = E \cdot \frac{Z_C}{Z_R + Z_C} = 20\angle 0 \cdot \frac{3\angle -90}{2-3j}$

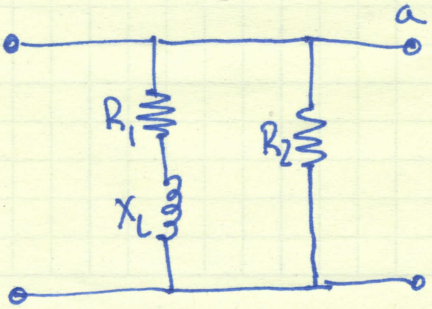
$V_{cd} = 16{,}6 \angle \underline{-33{,}7}^{\circ} = E_{TH}$



19-15



Z_N



$Z_N = (Z_{R1} + Z_L) \,||\, Z_{R2} = (20+20j) \,||\, 68$

$Z_N = 21{,}3 \angle \underline{32{,}2}^{\circ}\ \Omega$

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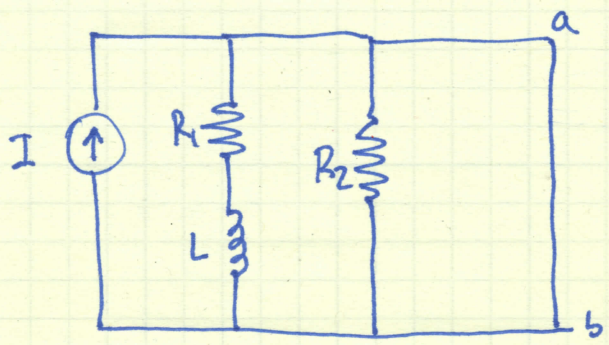
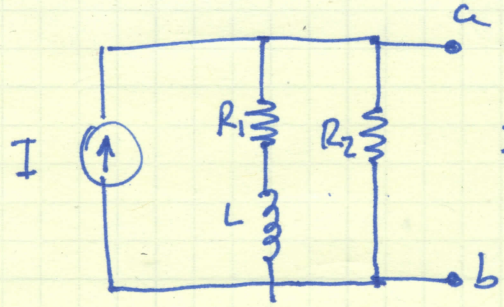
I_N



$I_N = I = 0{,}1\,A \angle 0$

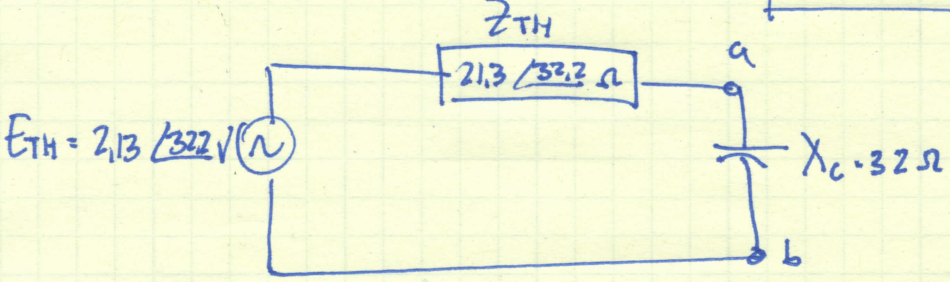
$Z_{TH} = Z_N = 21{,}3 \angle 32{,}2^{\circ}\ \Omega$



$E_{TH} = I \cdot (Z_{TH}) = (0{,}1\,A \angle 0) \cdot (21{,}3 \angle 32{,}2)$

$E_{TH} = 2{,}13\,V \angle 32{,}2$

$Z_{TH} = 21{,}3 \angle 32{,}2\ \Omega$



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