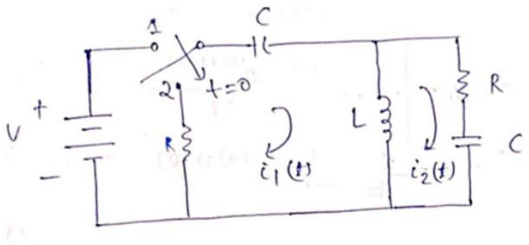
NETWORK THEORY (EC2001)

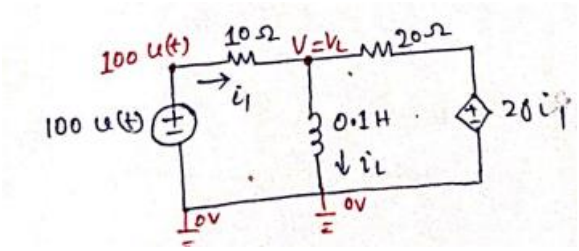
Assignment 2

1. i) Determine $i_1(0^+)$ for the circuit shown in figure

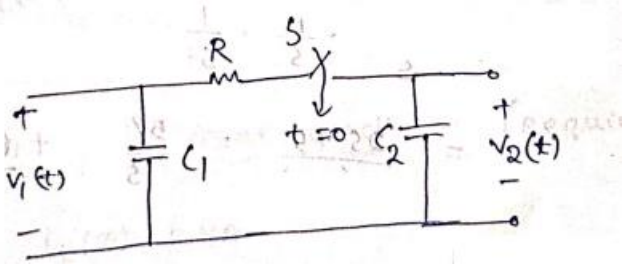


ii) Let $I_1(S)$ and $I_2(S)$ are the laplace transform of $I_1(t)$ and $I_2(t)$ respectively then determine the expression of $I_1(S)$ and $I_2(S)$

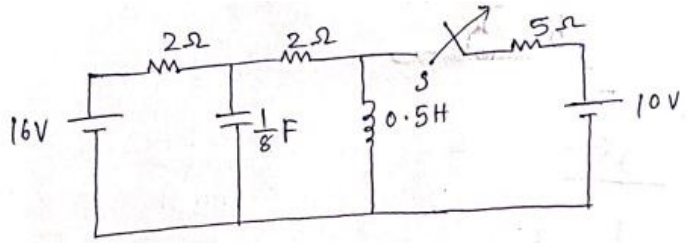
2. Determine i_L and i_1 for $t \geq 0$

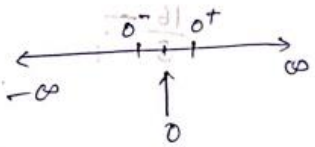


3. Determine the steady-state voltages across the capacitor for C1=1F, C2=1/2 F, $V_1(0)$=2V,$V_2(0)$=1V, R=1Ω



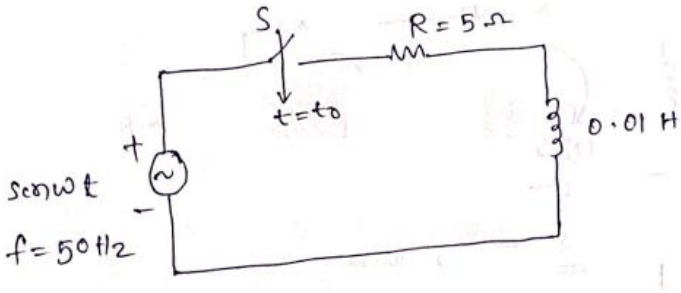
4.





Det. (a) $e_1(0^+)$ (b) $i_L(0^+)$ (c) $e_1(t)$ for $t \geq 0$ (d) $i_L(t)$ for $t \geq 0$.

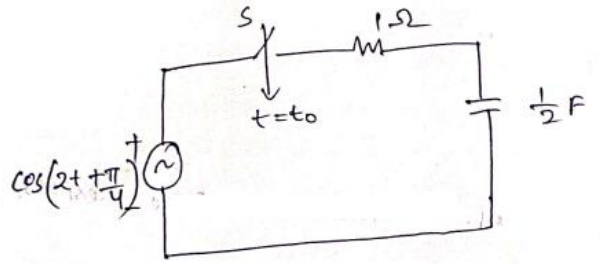
5. i) Find the value of t_0 which results in a transient free response



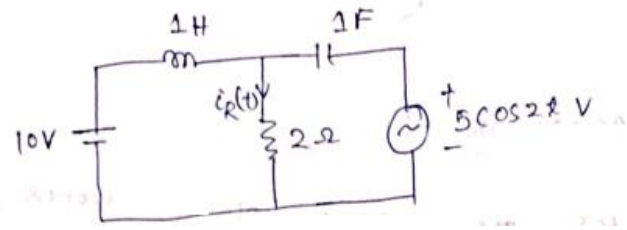
ii) In the above case, if the excitation is cos $\omega_0 t$, then t_0

iii) In the above case, if the excitation is sin $(\omega t - 10^o)$, then t_0

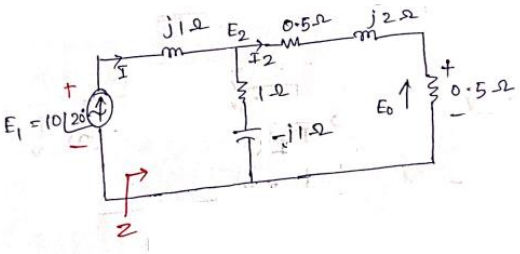
iv) Find the value of t_0



6. Determine the current $i_R(t)$, provided the network is in the steady state

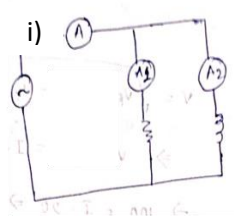


7. Determin I_1, I_2 , E_0, E_2 Network is in steady state and is in phasor domain



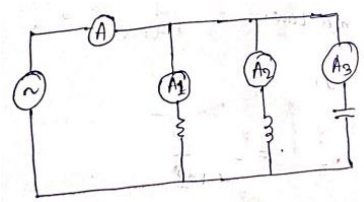
8.

i)

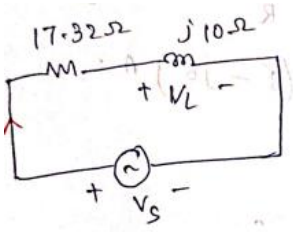


A1 reads 8A
A2 reads 6A
Then A reads.

ii) A_1 leads 6A, A_2 leads 12A, A_3 leads 20A then A leads

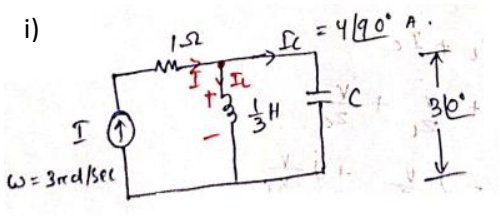


9. The angle between V_L and V_S is……The network is in steady state

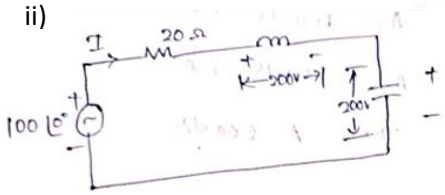


10. Determine I, network is in steady state

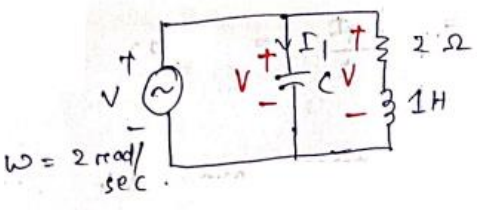
i)



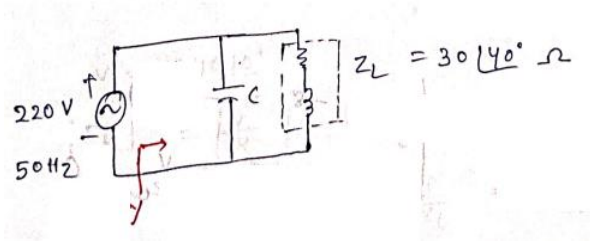
ii)



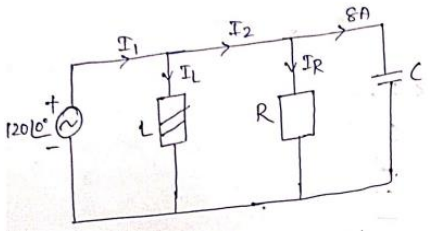
11. The phasor I_1 leads I_2 by…..? The network is in steady state



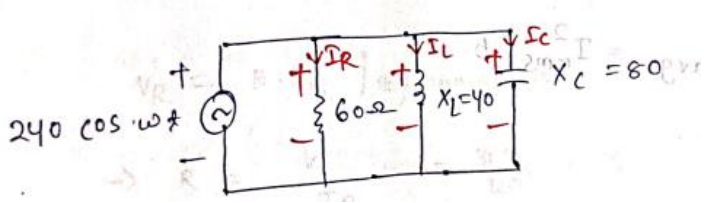
12. Network is in steady state. What the value of C will result a unity P.F at the a.c source



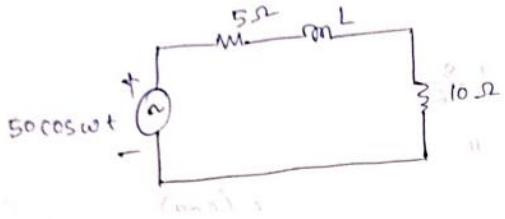
13. Network is in steady state. If I I_1 I= I I_2 I= 10A the I_L and I_R are ? Also find P.F



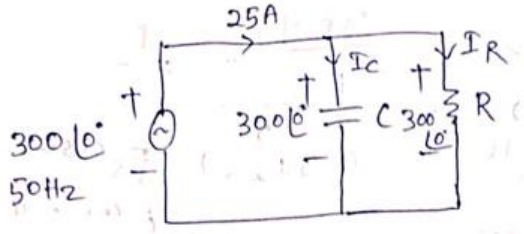
14. Network is in steady state, determine the average power dissipated and the P.F of the circuit.



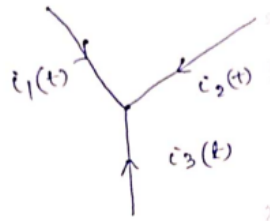
15. Network is in steady state, determine the average power dissipated in 5Ω resistor is 10 watt, the the P.F of the circuit



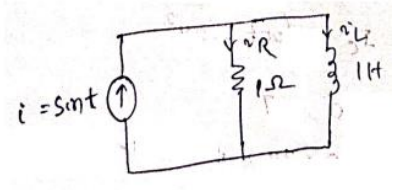
16. A 159.23 μF capacitor is in parallel with a resistor R draws a current of 25A from a 300V, 50Hz supply. Determine the frequency at which the circuit draws the same 25A from a 360V supply.



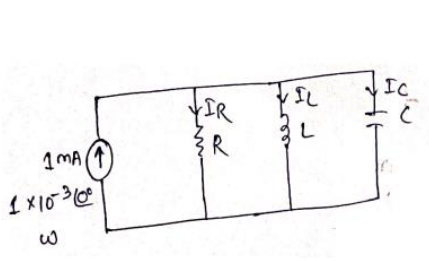
17. Let $i_1(t)$= -sinωt mA, $i_2(t)$= cosωt mA then $i_3(t)$=?



18. Network is in steady state, determine the steady state current i_R and i_L



19. At resonance which one of the statement is true



(a) $|I_R| < 1mA$

(b) $|I_R + I_L| < 1mA$

(c) $|I_R + I_C| > 1mA$

(d) $|I_L + I_C| > 1mA$

20. In a series RLC circuit Vs=100, R=10 Ω, XL= 20 and Xc=20, the voltage across the capacitor is

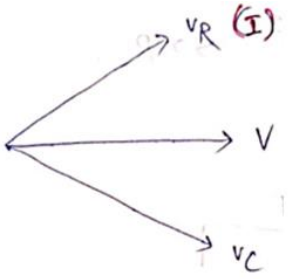
21.i) In a series RLC circuit the Q factor is 100. If all the component are doubled then

ii) In the above case the circuit is parallel

22.i) In a series RLC circuit the P.F at $f=F_L$ is

ii) In the above case the circuit is parallel RLC then $f=F_L$ is

23. In a series RLC circuit the phasor diagram at a certain frequency is shown in figure, the operating frequency is



a) $f = 0$

b) $f = f_o$

c) $f < f_o$

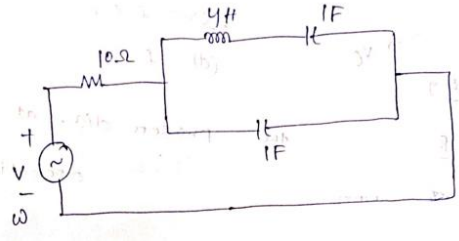
d) $f > f_o$

24.At resonance, the parallel circuit of the figure is constituted by an iron cored coil and the capacitor will behaves like

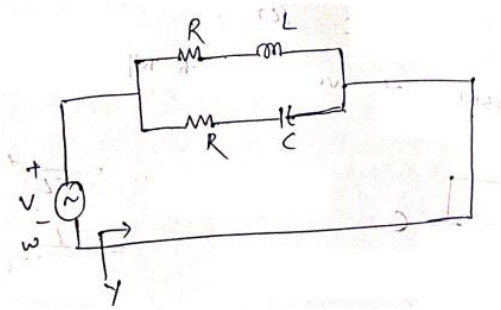
a) an open circuit b) a short circuit c) pure resistor of R

d) a pure resistor of value much higher than R

25. Network is in steady state, determine ω_0

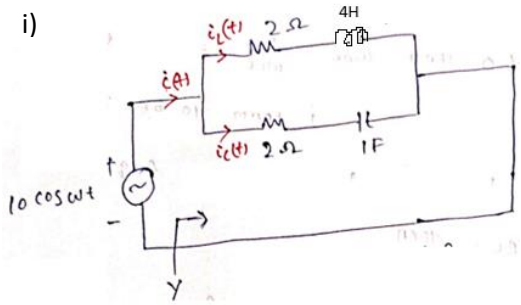


26. Network is in steady state, determine ω_0 what happens when $L=CR^2$

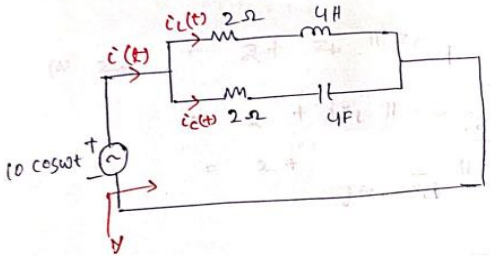


27. Network is in steady state, determine the average power dissipated in the circuit at resonance

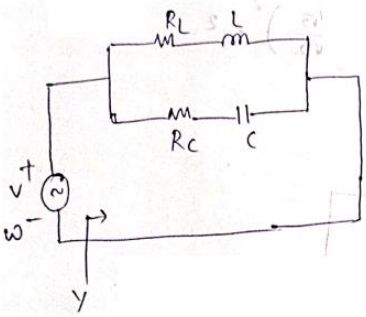
i)



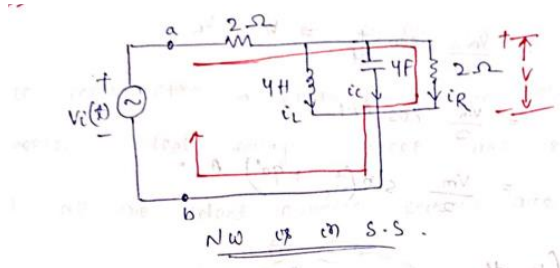
ii)



28. Network is in steady state, determine ω_0



29.



NW is in S.S.

Det. (a) $\omega = \omega_0$ at which Z_{ab} is max.

(b) $Z_{ab}\big|_{\omega=\omega_0} = ?$

(c) if $V_i(t) = V_m \sin \omega t$ then i_R, i_L & i_C are.