Tutorial Sheet-1

(1) Find the phasors corresponding to the following signals:

A.

(a) $v(t) = 21\cos(4t - 15^\circ)\ V$

(b) $i(t) = -8\sin(10t + 70^\circ)\ mA$

(c) $v(t) = 120\sin(10t - 50^\circ)\ V$

(d) $i(t) = -60\cos(30t + 10^\circ)\ mA$.

B.

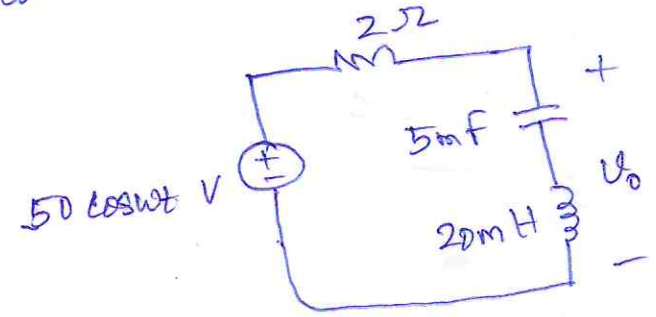
(2) Using phasors, find:

(a) $3\cos(2t + 10^\circ) - 5\cos(2t - 30^\circ)$

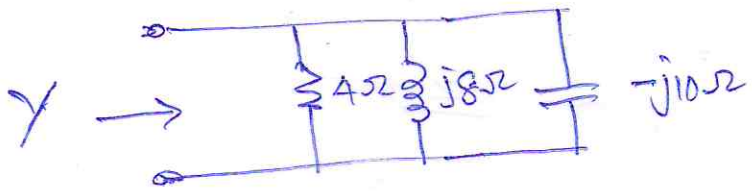
(b) $40\sin 50t + 30\cos(50t - 45^\circ)$

(c) $20\sin 400t + 10\cos(400t + 60^\circ) - 5\sin(400t - 20^\circ)$

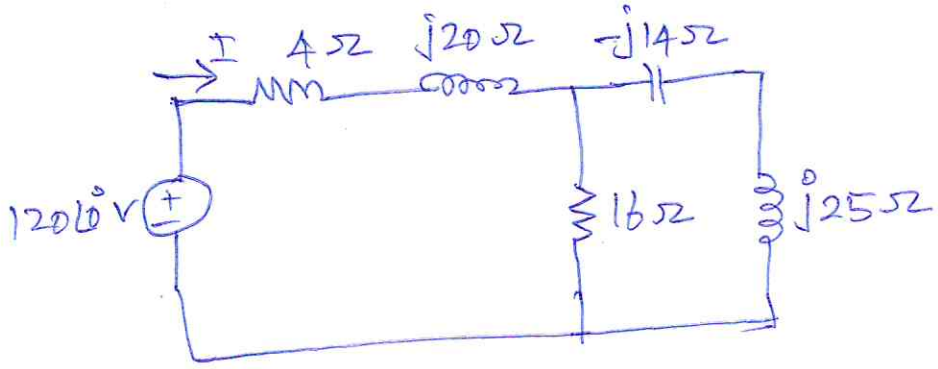
(2) What value of ω will cause the forced response v_o, to be zero in the circuit below.



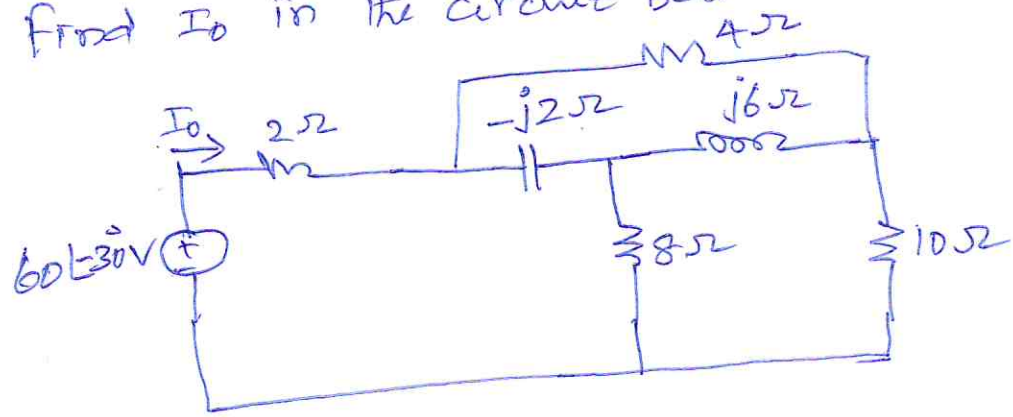
(3) Determine the admittance Y for the circuit below.



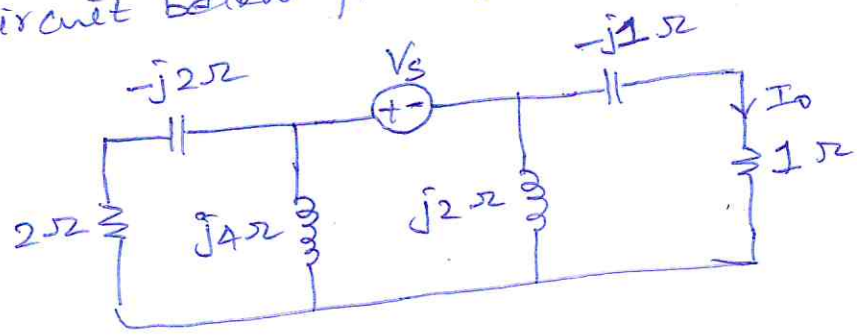
(4) For the circuit shown below, find Z_{eq} and use that to find current I. Let $\omega = 10\ 4\text{rad/s}$.



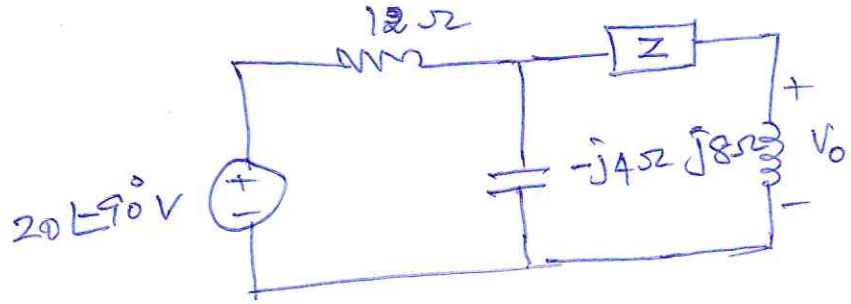
(5) Find I_o in the circuit below



(6) In the circuit below find V_s if $I_o = 2\angle 0°$ A.



(7) Find Z in the network below, given that $V_o = 4\angle 0°$ V.

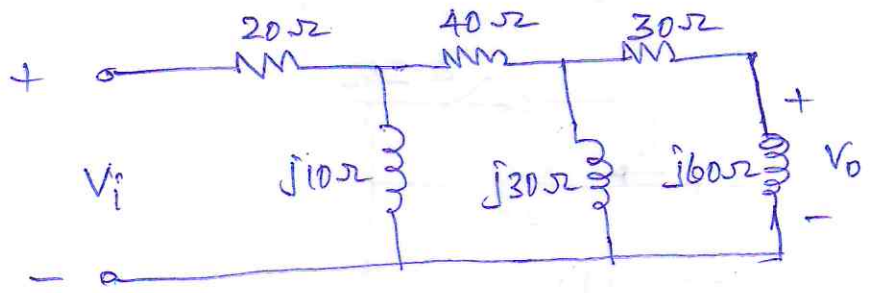


(8) A coil with impedance $(8+j6)\Omega$ is connected in series with a capacitive reactance X. The series combination is connected in parallel with a resistor R. Given that the equivalent impedance of the resulting circuit is $5\angle 0^\circ\ \Omega$. Find the value of R and X.

(9) (10) (a) Calculate the phase shift of the circuit below.

(b) State whether the phase shift is leading or lagging (output with respect to input)

(c) Determine the magnitude of the output when the input is 120 V.



(10) The circuit below shows a parallel combination of an inductance and a resistance. If it is desired to connect a capacitor in series with the parallel combination such that the net impedance is resistive at 10 MHz, what is the required value of C?