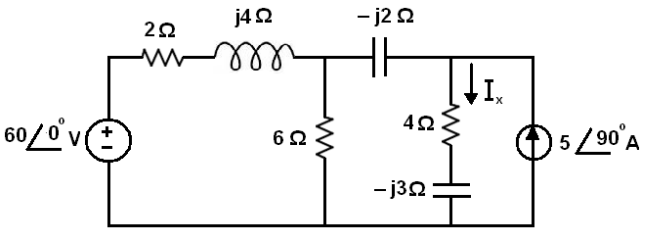
Cairo University
Faculty of Engineering
Electronics and Electrical
Communication Department.

AC Circuits 1
1st year
Dr. Omar Bakry

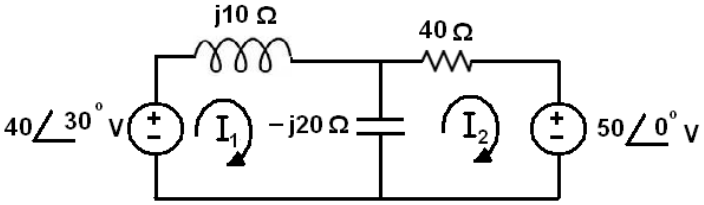
SHEET 5
SINUSOIDAL STEADY-STATE ANALYSIS

Problem [1]:
Use source transformation to find I_x in the circuit shown to the right.



Answers: $I_x = 5.238\angle 17.35^o\ A$

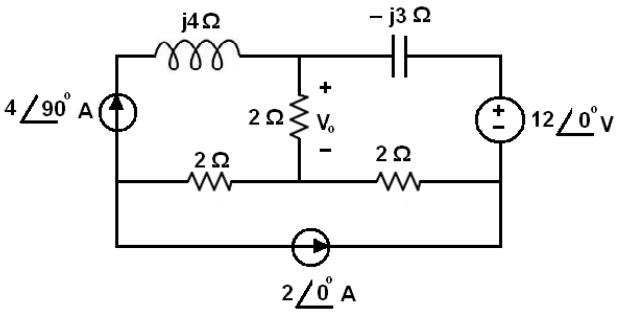
Problem [2]:
Using loop analysis, find I_1 and I_2 in the circuit shown.



Answers: $I_1 = 4.698\angle 95.24^o\ A,$
$I_2 = 0.9928\angle 37.71^o\ A.$

Problem [3]:
Repeat solving problem 2 using source transformation.

Problem [4]:
Compute V_o in the circuit shown using loop analysis.

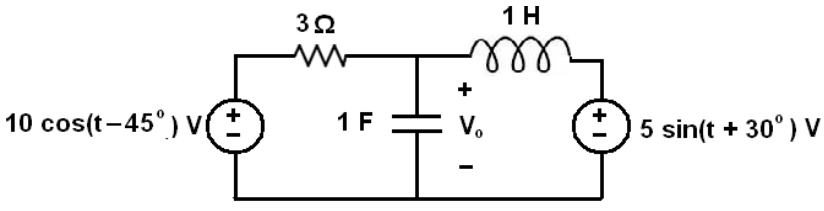


Answers: $V_o = 11.648\angle 52.82^o\ V$

Problem [5]:
Repeat solving problem 4 using superposition method.

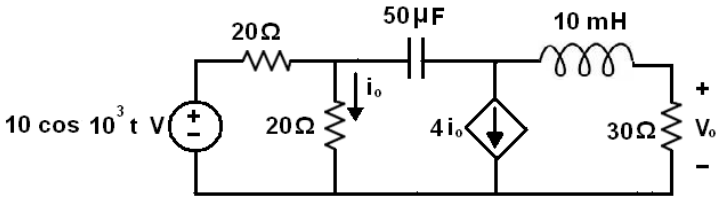
Problem [6]:
Use node analysis to find $v_o(t)$ in the circuit shown below.

Answers: $v_o(t) = 15.73\cos(t + 247.9^o)\ V$

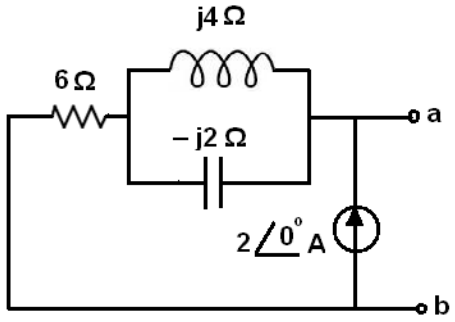


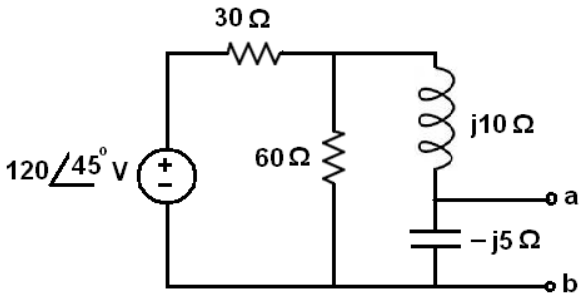
Problem [7]:
Use node analysis to find $v_o(t)$ in the circuit shown below.

Answers: $v_o(t) = 6.154\cos(10^3 t + 70.26^o)\ V$



Problem [8]:
For each of the circuits in the figure shown below, obtain the Thevenin and Norton equivalent circuits at Terminals *a-b*.





Answers:

$Z_{th} = Z_N = 7.211\angle -33.69^o\ \Omega$
$V_{th} = 14.422\angle -33.69^o\ V$
$I_N = 2\angle 0\ A$

$Z_{th} = Z_N = 5.423\angle -77.47^o\ \Omega$
$V_{th} = 19.4\angle -59^o\ V$
$I_N = 3.578\angle 18.43^o\ A$

Homework:
Find $i_o(t)$ and $v_o(t)$ for the circuit shown below.