1) (a) The impedance Z of the circuit shown below in Figure 1 is purely real (*i.e., purely resistive*) at a frequency $f = 60$ Hz.

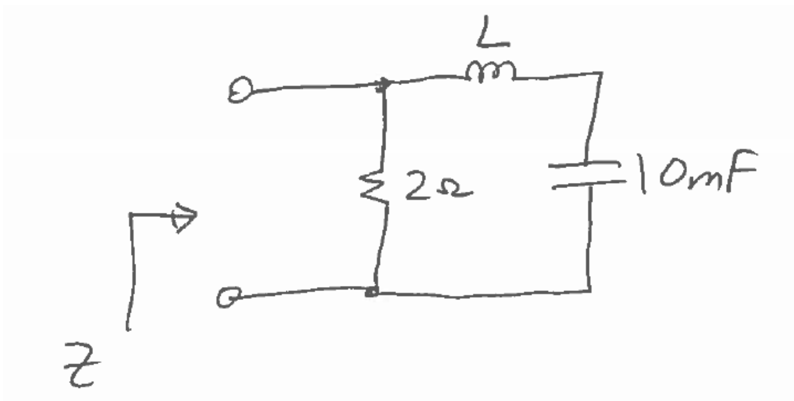

Figure 1. Circuit for Problem 1, part (a).

(i) In units of henrys, what is the value of L? Solve this by hand. Report your L value with appropriate units in proper engineering notation format with two decimal places of precision. *Show your work.*

(ii) Run the LTSpice verification testbench file for this problem and use the .meas results to verify your by-hand work; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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(*Problem 1, continued*)

(b) Consider the circuit shown in Figure 2 below.

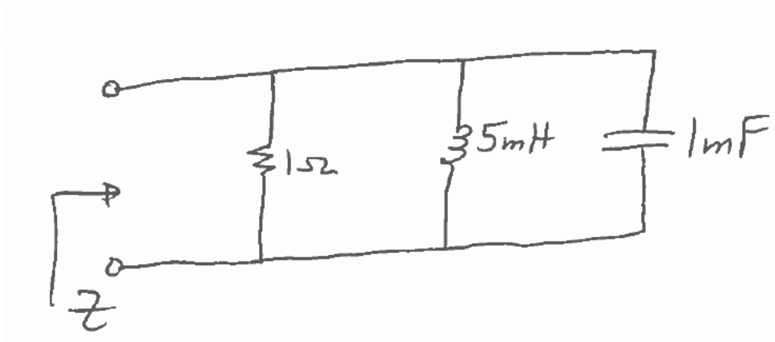

Figure 2. Circuit for Problem 1, part (b).

(i) Find the frequency, both ω in units of rps and f in units of Hz, at which the impedance Z is purely resistive. Solve this by hand. Report your two frequency values with appropriate units in proper engineering notation format with two decimal places of precision. *Show your work.*

(ii) Run the LTSpice verification testbench file for this problem and use the .meas results to verify your by-hand work; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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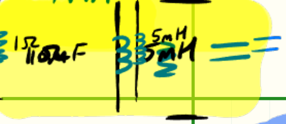
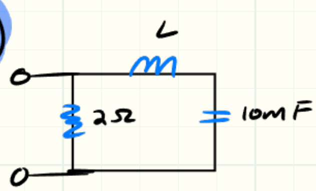


1. a)



Purely Real impedence

$f = 60Hz$

$Z_L = Z_C$

$j\omega L = \frac{1}{j\omega C}$

$\omega L = 1/\omega C$

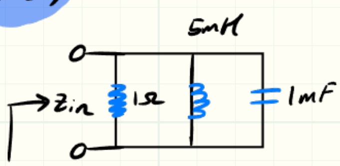
$2\pi f L = 1/2\pi f C$

$L = 1/(2\pi f)^2 C$

$L = 1/(2\pi(60))^2(10\times10^{-3})$

$\boxed{L = 703.62\mu H}$

1.b)



$Z_{in} = 0$

$Z_C + Z_L = 0$

$\frac{-j}{\omega C} + \omega L = 0$

$\omega L = 1/\omega C$

$\omega^2 LC = 1$

$\omega = 1/\sqrt{LC}$

$\omega = 1/\sqrt{(5\times10^{-3})(1\times10^{-3})}$

$\boxed{\omega = 447.21\ rad/s}$

$f = \frac{\omega}{2\pi}$

$f = \frac{447.21}{2\pi}$

$\boxed{f = 71.17 Hz}$

SPICE Output Log: G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob1a.log

```
LTspice 24.0.12 for Windows
Circuit: * G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob1a.asc
Start Time: Sat Nov 22 16:05:12 2025
solver = Normal
Maximum thread count: 12
tnom = 27
temp = 27
method = modified trap
.OP point found by inspection.

freqval: ph(v(vzeq))=0 AT 59.5693200366
zeqval: v(vzeq)=(0.00385731780048,-89.6124123573°) at 59.5693200366
reqval: re(v(vzeq))=(2.60933235147e-05,0°) at 59.5693200366

Total elapsed time: 0.138 seconds.
```

SPICE Output Log: G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob1b.log

```
LTspice 24.0.12 for Windows
Circuit: * G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob1b.asc
Start Time: Sat Nov 22 16:08:00 2025
solver = Normal
Maximum thread count: 12
tnom = 27
temp = 27
method = modified trap
.OP point found by inspection.

freqval: ph(v(vzeq))=0 AT 71.1796537316
zeqval: v(vzeq)=(0.999924090883,3.18281169982e-05°) at 71.1796537316
reqval: re(v(vzeq))=(0.999924090883,0°) at 71.1796537316

Total elapsed time: 0.148 seconds.
```

2) Consider the time-domain circuit shown in Figure 3 below.

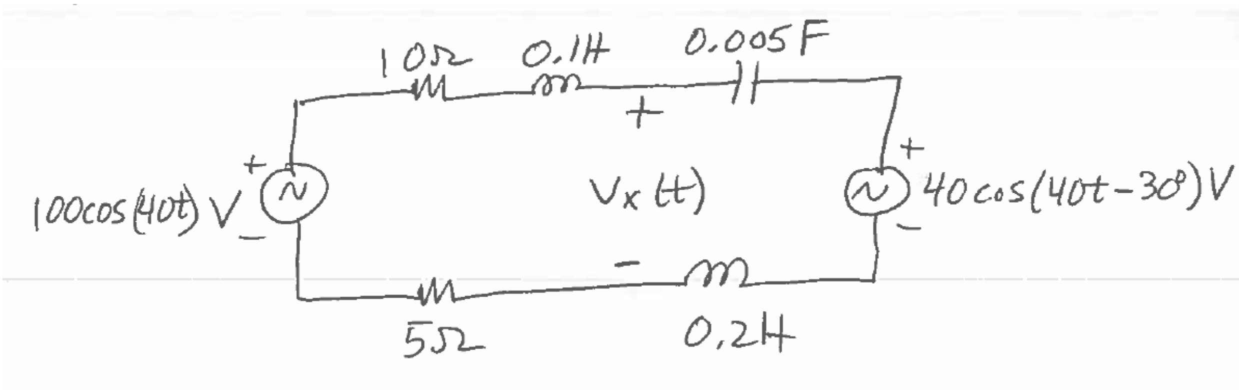


Figure 3. Circuit for Problem 2.

(i) Find $V_x(t)$, and also state the phasor value of V_x. Solve this by hand. Include units with your two answers. Write the phasor value of V_x in both rectangular form and polar form, and make it easy to distinguish your phasor-domain and time-domain answers. Your time-domain result should be written as a valid time-domain cosine waveform, and there should not be any "j"s or angle signs in your answer for $V_x(t)$, either. Expect zero credit for hard-to-decipher, incorrect work. *Show your work.*

(ii) Run the LTSpice verification testbench file for this problem and use the .ac report results to verify your by-hand work for the phasor voltage V_x in polar form; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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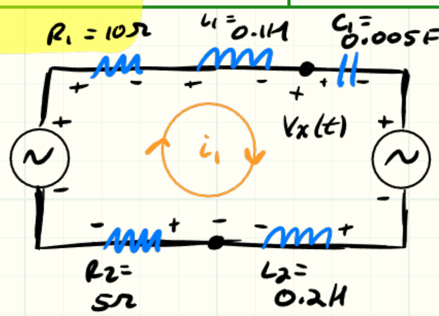
2.)

$100\cos(40t)$

$100\angle 0^\circ$

$100 + 0j$



$40\cos(40t - 30^\circ)\,V$

$40\angle -30^\circ$

$34.64 - 20j$

$Z_{R_1} = 10\Omega$

$Z_{R_2} = 5\Omega$

$Z_{L_1} = j(40)(0.1) = 4j\,\Omega$

$Z_{L_2} = j(40)(0.2) = 8j\,\Omega$

$Z_C = 1/j(40)(0.005) = -5j\,\Omega$

KVL @ i_1

$$-40\angle 0^\circ + Z_{R_1} i_1 + Z_{L_1} i_1 + Z_C i_1 + 40\angle -30^\circ + Z_{L_2} i_1 + Z_{R_2} i_1 = 0$$

$$i_1\left[Z_{R_1} + Z_{L_1} + Z_C + Z_{L_2} + Z_{R_2}\right] = 100 - (34.63 - 20j)$$

$$i_1 = \frac{(100 - (34.64 - 20j))}{[10 + 4j - 5j + 8j + 5]} = \frac{65.359 + 20j}{(15 + 7j)}$$

$$i = 4.088 - 0.574j$$
$$4.129\angle -8^\circ$$

$$V_x(t) = Z_{eq} \cdot i + 40\angle -30^\circ$$
$$V_x(t) = [Z_C + Z_{L_2}]\, i + [34.64 - 20j]$$
$$V_x(t) = [-5j + 8j](4.088 - 0.57j) + [34.64 - 20j]$$

$$\boxed{V_x(t) = 36.366 - 7.733j \quad 37.179\angle -12.005^\circ}$$
$$\boxed{V_x(t) = 37.179\cos(40t - 12.005^\circ)\,V}$$

* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob2.asc

```
       --- AC Analysis ---

frequency:     6.3662         Hz
V(n001):       mag:        100 phase:           0°        voltage
V(n002):       mag:        100 phase: 2.03555e-15°        voltage
V(n003):       mag:    59.3889 phase:     5.55473°        voltage
V(vxpos):      mag:    57.7924 phase:    -10.5761°        voltage
V(n004):       mag:    60.4902 phase:     9.35969°        voltage
V(vxneg):      mag:     20.646 phase:    -8.00266°        voltage
V(n005):       mag:    38.9549 phase:      49.992°        voltage
V(vx):         mag:    37.1787 phase:    -12.0049°        voltage
I(C1):         mag:    4.12921 phase:     171.997°        device_current
I(L1):         mag:    4.12921 phase:    -8.00266°        device_current
I(L2):         mag:    4.12921 phase:     171.997°        device_current
I(R1):         mag:    4.12921 phase:    -8.00266°        device_current
I(R2):         mag:    4.12921 phase:     171.997°        device_current
I(E1):         mag:          0 phase:           0°        device_current
I(V1):         mag:    4.12921 phase:     171.997°        device_current
I(V2):         mag:    4.12921 phase:    -8.00266°        device_current
I(V3):         mag:    4.12921 phase:    -8.00266°        device_current
```

3) Consider the time-domain circuit shown in Figure 4 below.

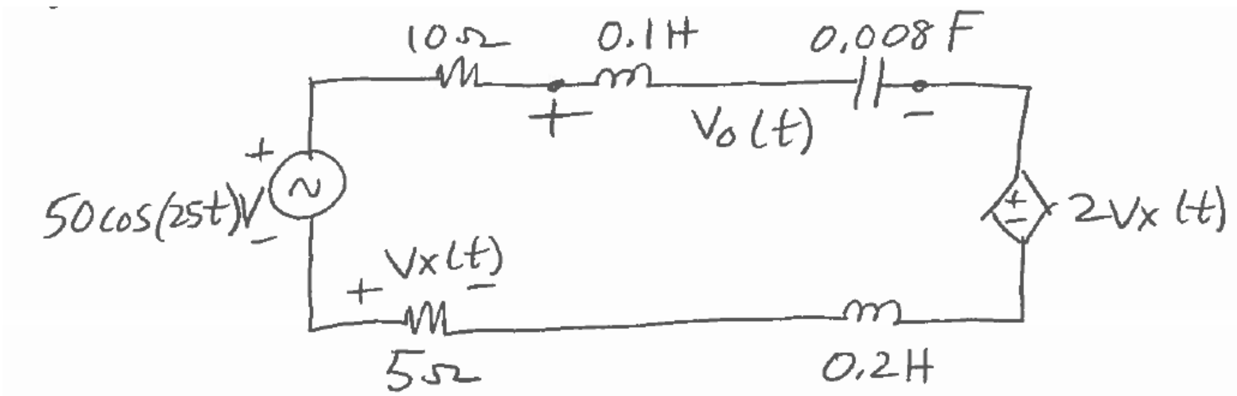


Figure 4. Circuit for Problem 3.

i) Find $V_o(t)$, and also state the phasor value of V_o. Solve this by hand. Include units with your two answers. Write the phasor value of V_o in both rectangular form and polar form, and make it easy to distinguish your phasor-domain and time-domain answers. Your time-domain result should be written as a valid time-domain cosine waveform, and there should not be any "j"s or angle signs in your answer for $V_o(t)$, either. Expect zero credit for hard-to-decipher, incorrect work. *Show your work.*

ii) Run the LTSpice verification testbench file for this problem and use the .ac report results to verify your by-hand work for the phasor voltage V_o in polar form; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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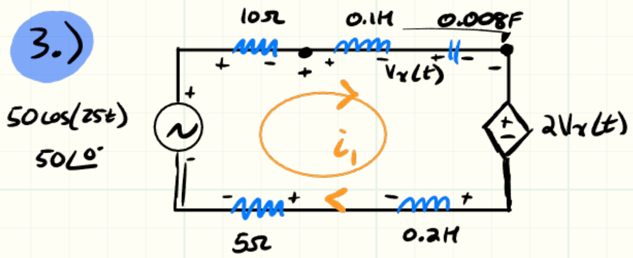
3.)



$V_o(t) = Z_{eq} \cdot i_1$

$V_o(t) = [Z_{L_1} + Z_C](8-4j)$

$V_o(t) = [2.5j - 5j](8-4j)$

$V_o(t) = -10 - 20j$

$$\boxed{\begin{gathered} V_o(t) = 22.361\angle -116.565^\circ \\ V_o(t) = 22.36\cos(25t - 116.565^\circ) \end{gathered}}$$

$\omega = 25$

$Z_{L_1} = j\omega L = j(25)(0.1) = 2.5j$

$Z_{L_2} = j\omega L = j(25)(0.2) = 5j$

$Z_C = 1/j\omega C = 1/j(25)(0.008) = -5j$

<u>KVL @ loop i_1</u>

$-50 + Z_{R_1} i_1 + Z_{L_1} i_1 + Z_C i_1 + 2V_x(t) + Z_{L_2} i_1 + Z_{R_2} i_1 = 0$

$i[Z_{R_1} + Z_{L_1} + Z_C + Z_{L_2} + Z_{R_2}] + 2(-Z_{R_2}) = 50$

$i_1[\cancel{10} + 2.5j - \cancel{5j} + \cancel{5j} + 5] + 2(\cancel{-5}) = 50$

$i_1[5 + 2.5j] = 50$

$i_1 = 50/(5 + 2.5j) = 8 - 4j$

```
* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob3.asc

       --- AC Analysis ---

frequency:      3.97887         Hz
V(n001):        mag:    22.3607 phase:   -116.565°          voltage
V(vxpos):       mag:    63.2456 phase:   -161.565°          voltage
V(n002):        mag:    22.3607 phase:   -116.565°          voltage
V(n1):          mag:    92.1954 phase:    167.471°          voltage
V(n003):        mag:        100 phase:       -180°          voltage
V(n2):          mag:    89.4427 phase:    153.435°          voltage
V(vxneg):       mag:    44.7214 phase:   -116.565°          voltage
V(vout):        mag:    22.3607 phase:   -116.565°          voltage
I(C1):          mag:    8.94427 phase:    153.435°          device_current
I(L1):          mag:    8.94427 phase:   -26.5651°          device_current
I(L2):          mag:    8.94427 phase:    153.435°          device_current
I(R1):          mag:    8.94427 phase:   -26.5651°          device_current
I(R2):          mag:    8.94427 phase:    153.435°          device_current
I(E1):          mag:    8.94427 phase:   -26.5651°          device_current
I(E2):          mag:          0 phase:          0°          device_current
I(V1):          mag:    8.94427 phase:    153.435°          device_current
I(V2):          mag:    8.94427 phase:   -26.5651°          device_current
```

4) Consider the phasor-domain circuit shown in Figure 5 below.

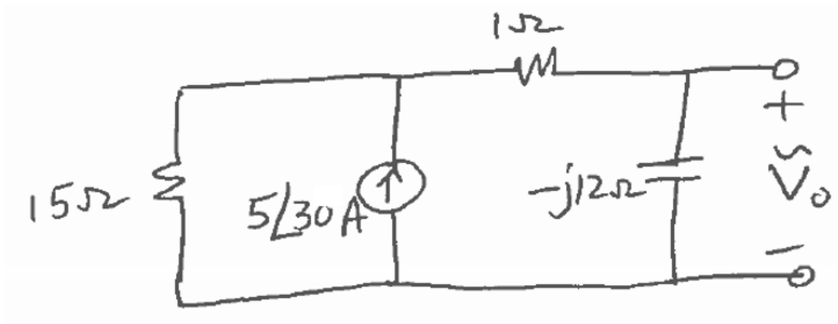


Figure 5. Circuit for Problem 4.

i) Find the phasor voltage V_o. Solve this by hand. Write the phasor value of V_o in both rectangular form and polar form, and include units with both your rectangular and polar form answers. Expect zero credit for hard-to-decipher, incorrect work. *Show your work.*

ii) Run the LTSpice verification testbench file for this problem and use the .ac report results to verify your by-hand work for the phasor voltage V_o in polar form; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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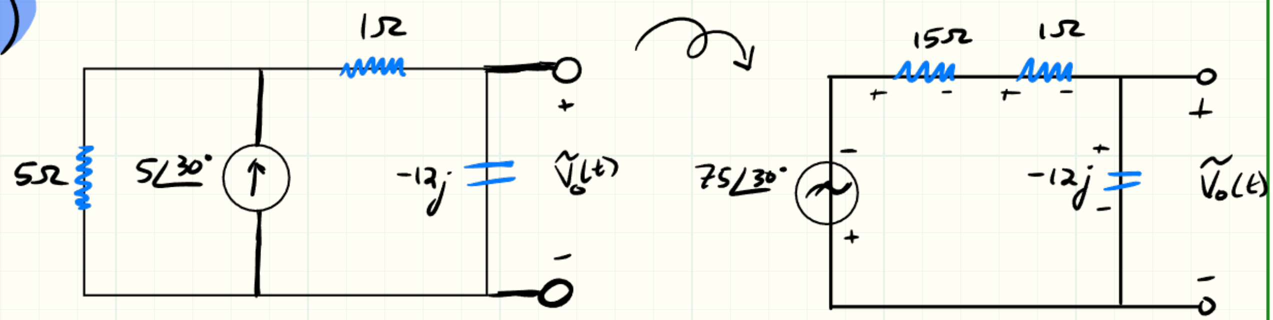
4.)



$$Z_{eq} = 15\Omega + 1\Omega - 12j$$

$$Z_{eq} = 16 - 12j$$

$$V_o = \tilde{V}_{in} \cdot \left(\frac{Z_c}{Z_c + (R_1 + R_2)}\right)$$

$$V_o = 75\angle 30^\circ \left(\frac{-12j}{-12j + (15+1)}\right)$$

$$V_o = \left[\frac{-12j}{16-12j}\right]\left[64.952 + 37.5j\right]$$

$$\boxed{\begin{array}{l} V_o = 41.383 - 17.677j \\ V_o = 45\angle -23.13^\circ \, V \end{array}}$$

* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob4.asc

```
       --- AC Analysis ---

frequency:     7.95775      Hz
V(n001):       mag:    45.1554 phase:    -18.3669°          voltage
V(vout):       mag:    44.9994 phase:    -23.1307°          voltage
I(C1):         mag:    3.75003 phase:     66.8693°          device_current
I(I1):         mag:          5 phase:          30°          device_current
I(R1):         mag:    3.01036 phase:    -18.3669°          device_current
I(R2):         mag:    3.75003 phase:    -113.131°          device_current
```

5) Consider the phasor-domain circuit shown in Figure 6 below.

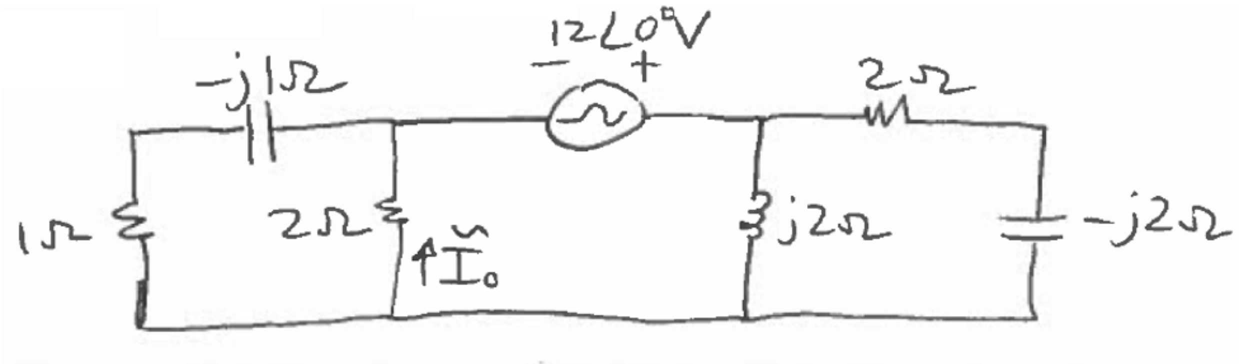


Figure 6. Circuit for Problem 5.

i) Apply nodal analysis to determine the phasor-domain current I_0. Solve this by hand. Write the phasor value of I_o in both rectangular form and polar form, and include units with both your rectangular and polar form answers. Expect zero credit for hard-to-decipher, incorrect work. *Show your work.*

ii) Run the LTSpice verification testbench file for this problem and use the .ac report results to verify your by-hand work for the phasor voltage I_o in polar form; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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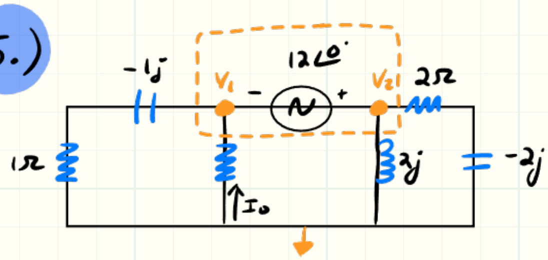
5.)



$V_2 - V_1 = 12$

$V_2 = V_1 + 12$

KCL @ Supernode

$$\frac{V_1}{1-j} + \frac{V_1}{2} + \frac{V_2}{2j} + \frac{V_2}{2-2j} = 0$$

$$V_1\left(1 + \tfrac{1}{2}j\right) + V_2\left(\tfrac{1}{4} - \tfrac{1}{4}j\right) = 0$$

$$V_1(1 + 1/2j) + (V_1 + 12)(1/4 - 1/4j) = 0$$

$$V_1(1 + 1/2j) + V_1(1/4 - 1/4j) + (3 - 3j) = 0$$

$$V_1(1.25 + 0.25j) + (3 - 3j) = 0$$

$$V_1 = \frac{-(3-3j)}{(1.25+0.25j)} = -1.846 + 2.769j$$

$$\tilde{I}_o = -\frac{V_1}{2} = \frac{-(-1.846 + 2.769j)}{2}$$

$$\tilde{I}_o = 0.963 - 1.385j$$

$$\boxed{\tilde{I}_o = 1.664\angle -56.31^\circ \text{ A}}$$

* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob5.asc

```
       --- AC Analysis ---

frequency:      7.95775         Hz
V(n003):        mag:    10.5247 phase:    15.2551°         voltage
V(n002):        mag:     3.3282 phase:     123.69°         voltage
V(n001):        mag:    2.35339 phase:     168.69°         voltage
V(n005):        mag:     3.3282 phase:     123.69°         voltage
V(n004):        mag:    7.44208 phase:   -29.7449°         voltage
I(C1):          mag:    2.35339 phase:     168.69°         device_current
I(C2):          mag:    3.72104 phase:   -119.745°         device_current
I(L1):          mag:    5.26235 phase:   -74.7449°         device_current
I(R1):          mag:    2.35339 phase:     168.69°         device_current
I(R2):          mag:     1.6641 phase:     123.69°         device_current
I(R3):          mag:    3.72104 phase:   -119.745°         device_current
I(V1):          mag:    3.72104 phase:    150.255°         device_current
I(V2):          mag:     1.6641 phase:   -56.3099°         device_current
```

6) Consider the phasor-domain circuit shown in Figure 7 below.

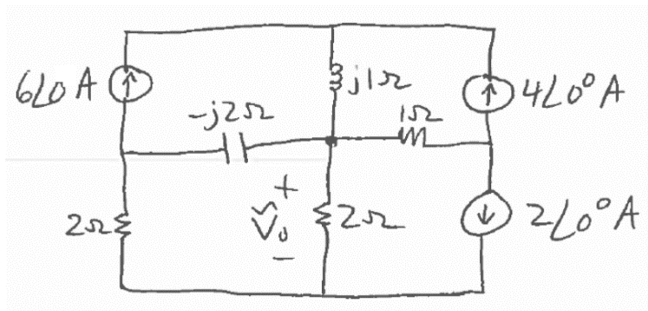


Figure 7. Circuit for Problem 6.

i) Use mesh analysis to find the phasor-domain voltage V_0. <u>Solve this by hand.</u> Write the phasor value of I_o in both rectangular form and polar form, and include units with both your rectangular and polar form answers. Expect zero credit for hard-to-decipher, incorrect work. *Show your work.*

ii) Run the LTSpice verification testbench file for this problem and use the .ac report results to verify your by-hand work for the phasor voltage V_o in polar form; note that the comments in the testbench are there for you to read, comprehend, and do stuff with. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

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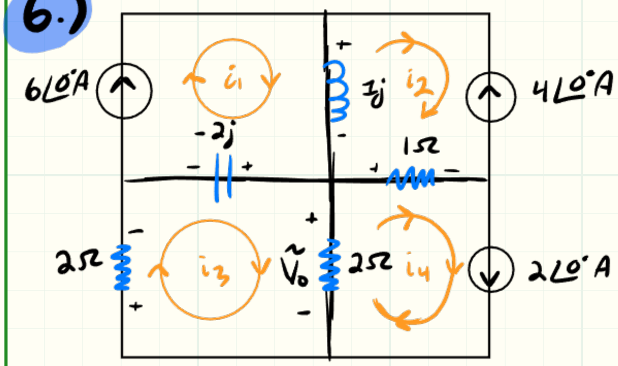
6.)



$i_1 = 6\angle 0$

$i_2 = -4\angle 0$

$i_4 = 2\angle 0°$

KVL @ i_3

$$+(2\Omega)(i_3) + (+2j)(i_1 - i_3) + (2\Omega)(i_3 - i_4) = 0$$

$$2i_3 + 2j\,i_1 - 2j\,i_3 + 2i_3 - 2i_4 = 0$$

$$(2j)i_1 + (4-2j)i_3 + (-2)i_4 = 0$$

$$(2j)(6) + (4-2j)i_3 + (-2)(2) = 0$$

$$12j + (4-2j)i_3 - 4 = 0$$

$$i_3 = \frac{(4-12j)}{(4-2j)}$$

$$i_3 = 2-2j$$

$$\tilde{V}_o = Z \cdot (i_3 - i_4)$$

$$\tilde{V}_o = (2\Omega)[(2-2j)-(2)]$$

$$\tilde{V}_o = -4j$$

$$\boxed{\tilde{V}_o = 4\angle -90° \qquad \tilde{I}_o = -2j \text{ or } 2\angle -90°}$$

* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob6.asc

```
       --- AC Analysis ---

frequency:     7.95775      Hz
V(n002):       mag:     5.65685 phase:          135°         voltage
V(n001):       mag:           6 phase:           90°         voltage
V(vout):       mag:           4 phase:          -90°         voltage
V(n003):       mag:      7.2111 phase:      -146.31°         voltage
I(C1):         mag:     4.47214 phase:      26.5651°         device_current
I(L1):         mag:          10 phase:  5.08889e-15°         device_current
I(I1):         mag:           6 phase:            0°         device_current
I(I2):         mag:           4 phase:            0°         device_current
I(I3):         mag:           2 phase:            0°         device_current
I(R1):         mag:     2.82843 phase:          135°         device_current
I(R2):         mag:           2 phase:          -90°         device_current
I(R3):         mag:           6 phase:          180°         device_current
```

7) For the circuit shown below in Figure 8:

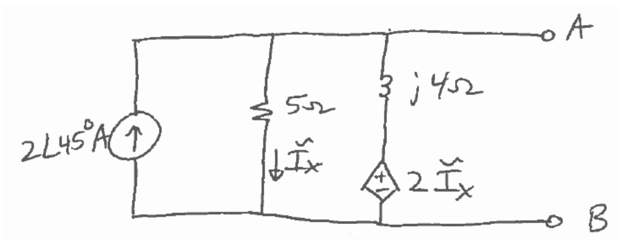


Figure 8. Circuit for Problem 7.

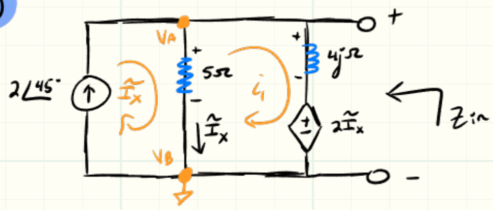
(a) Find the phasor-domain Thevenin model parameters V_{TH} and Z_{TH} with respect to nodes A and B. Solve this by hand, and *show your work*. Verify your by-hand work in LTSpice. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well.

(b) Find the value of Z_L that, when connected to nodes A and B, dissipates the maximum amount of power from the above circuit. Solve this by hand, and *show your work*. While LTSpice verification is not required for this part, you must get this part right in order to be eligible for any credit on this entire problem.

(c) With the constraint that the load be purely resistive, find the value of R_L that, when connected to nodes A and B, dissipates the maximum amount of power from the above circuit. Solve this by hand, and *show your work*. While LTSpice verification is not required for this part, you must get this part right in order to be eligible for any credit on this entire problem.

(d) Compute the *average power* delivered to the load for parts (b) and (c). Note that there are **two** by-hand answers for this part; thus, you should make it *really easy* for me to figure out which average load power quantity is for the load of part (b) and which average load power quantity is for the part (c) load. Solve this by hand, and *show your work*. Verify your by-hand work in LTSpice. Attach supporting evidence that you actually verified your by-hand work and that the results agree very well. Again, there are two quantities that need verifying in LTSpice, so make it clear that you verified both of them.

7.)



a.) $(v_1 - \tilde{I}_x) = (2\angle 45^\circ - \tilde{I}_x)$

KVL @ i_1

$5(\tilde{I}_x) - (2\angle 45 - \tilde{I}_x)j4 - 2\tilde{I}_x = 0$

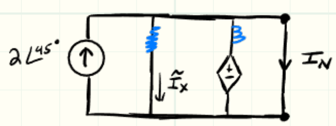
$3\tilde{I}_x + 4j\tilde{I}_x = 2\angle 45^\circ \cdot 4j$

$\tilde{I}_x = \dfrac{(2\angle 45^\circ \cdot 4j)}{(3+4j)}$

$V_{TH} = 5 \cdot I_x = 5 \cdot (0.226 + 1.584j)$

$V_{TH} = 1.130 + 7.920j$

$V_{TH} = 8\angle 81.87^\circ$



Current takes path of least Resistance $\tilde{I}_N = 2\angle 45^\circ$

$Z_{TH} = \dfrac{V_{TH}}{I_N} = \dfrac{8\angle 81.87^\circ}{2\angle 45^\circ}$

$Z_{TH} = 3.2 + 2.4j$

$Z_{TH} = 4\angle 36.87^\circ$

$\boxed{\begin{array}{l} V_{TH} = 1.13 + 7.92j \\ V_{TH} = 8\angle 81.87^\circ \\ Z_{TH} = 3.2 + 2.4j \\ Z_{TH} = 4\angle 36.87^\circ \end{array}}$

b.) Z_L at max

$Z_L = -Z_{TH}$

$\boxed{Z_L = -3.2 - 2.4j}$

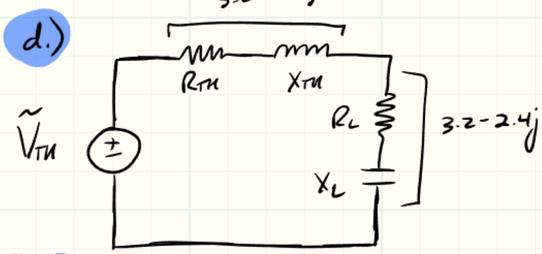
c.) load Purely Resistance

$R_L = \sqrt{R_{TH}^2 + Z_{TH}^2}$

$R_L = \sqrt{(3.2)^2 + (2.4)^2}$

$\boxed{R_L = 4\Omega}$

d.)



for part b

$P_{avg} = \frac{1}{2}|I_L|^2 R_L$

$I_L = \dfrac{V_{TH}}{Z_{TH} + Z_L}$; $R_L = R_{TH}$

$P_{avg} = \dfrac{1}{2}\dfrac{|V_{TH}|^2}{4R_{TH}} = \dfrac{|V_{TH}|^2}{8R_{TH}}$

$|V_{TH}| = \sqrt{(1.314)^2 + (7.9191)^2}$

$R_{TH} = Re\{Z_L\} = Re\{3.2 + 2.4j\}$

$R_{TH} = 3.2\Omega$

$P_{avg} = \dfrac{|8|^2}{8(3.2)} =$ $\boxed{P_{avg} = 2.5W}$

for part c

$P_{avg} = \frac{1}{2}|I_L|^2 R_L$

$I_L = \dfrac{V_{TH}}{Z_{TH} + Z_L} = \dfrac{V_{TH}}{(R_{TH} + R_L) + Z_{TH}}$

$P_{avg} = \dfrac{1}{2}\dfrac{|V_{TH}|^2 R_L}{(R_{TH} + R_L)^2 + Z_{TH}^2}$

$|V_{TH}| = 8V$

$R_{TH} = Re\{Z_L\} = Re\{3.2 + 2.4j\}$

$R_{TH} = 3.2\Omega$

$Z_{TH} = Im\{Z_L\} = Im\{3.2 + 2.4j\}$

$Z_{TH} = 2.4\Omega$

$R_L = 4\Omega$

$P_{avg} = \dfrac{1}{2}\dfrac{|8|^2(4)}{(3.2+4)^2 + 2.4^2}$

$P_{avg} = \dfrac{256}{2(57.6)}$

$\boxed{P_{avg} = 2.22W}$

Part a.)

* G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob7a.asc

```
       --- AC Analysis ---

frequency:     7.95775        Hz
V(vout):       mag:          8 phase:    81.8699°        voltage
V(n001):       mag: 8.88178e-16 phase:      180°        voltage
V(n003):       mag:        3.2 phase:    81.8699°        voltage
V(vzout):      mag:          4 phase:    36.8699°        voltage
V(n002):       mag: 4.44089e-16 phase:      180°        voltage
V(n004):       mag:        1.6 phase:    36.8699°        voltage
I(H1):         mag:        1.2 phase:    -8.1301°        device_current
I(H2):         mag:        0.6 phase:   -53.1301°        device_current
I(L1):         mag:        1.2 phase:    -8.1301°        device_current
I(L2):         mag:        0.6 phase:   -53.1301°        device_current
I(I1):         mag:          2 phase:        45°        device_current
I(I2):         mag:          0 phase:         0°        device_current
I(I3):         mag:          1 phase:         0°        device_current
I(R1):         mag:        1.6 phase:    81.8699°        device_current
I(R2):         mag:        0.8 phase:    36.8699°        device_current
I(V1):         mag:        1.6 phase:    81.8699°        device_current
I(V2):         mag:        0.8 phase:    36.8699°        device_current
```

Part b.)

SPICE Output Log: G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob7d.log

```
LTspice 24.0.12 for Windows
Circuit: * G:\My Drive\School\Electrical\ECT\HW\HW7\hw7_prob7d.asc
Start Time: Sat Nov 22 16:14:31 2025
l3: both pins shorted together -- ignoring.
solver = Normal
Maximum thread count: 12
tnom = 27
temp = 27
method = modified trap
WARNING: Less than two connections to node vrlckt1.  This node is used by e1.
WARNING: Less than two connections to node vrlckt2.  This node is used by e2.
Direct Newton iteration for .op point succeeded.

pload1: MAX(v(vrlckt1)*i(v3)/2)=2.50026047011 FROM 0 TO 0.5
pload2: MAX(v(vrlckt2)*i(v4)/2)=2.21992772377 FROM 0 TO 0.5

Total elapsed time: 0.402 seconds.
```