Problem 1
For the circuit below, find the following using voltage and current division (not node or mesh analysis) for

1. \( v_s(t) = 4 \cos(2\pi t) \)
2. \( v_s(t) = 4 \sin(1000\pi t) \)
   a) What is the current through the source?
   b) What is the current, \( i(t) \)?
   c) What is the voltage drop, \( V_o(t) \)?
Notice which frequencies cause \( Z_L \) and \( Z_C \) to be large.

![Circuit Diagram](image)

Given:
\[ L = 4 \, \text{H} \]
\[ C = 4 \, \text{F} \]
\[ R_1 = 10 \, \Omega \]
\[ R_2 = 15 \, \Omega \]

Problem 2

Find: The three node voltages
The four mesh currents
The voltage across \( C \)
The current through \( V_S \)
All answers should be expressed in the time domain.

Given:
\[ R_1 = 10 \, \Omega \]
\[ R_2 = 15 \, \Omega \]
\[ L = 2 \, \text{H} \]
\[ C = 0.4 \, \text{F} \]
\[ v_s(t) = 4\cos(4t) \, \text{V} \]
\[ i_{s1}(t) = 0.5\sin(4t+\frac{\pi}{4}) \, \text{A} \]
\[ i_{s2}(t) = \cos(4t) \, \text{A} \]

Problem 3

Given:
\[ R_1 = 5 \, \Omega \]
\[ R_2 = 10 \, \Omega \]
\[ L = 1.5\, \text{H} \]
\[ C = 10 \, \text{mF} \]
\[ i_s = 3 \, \text{A} \]
\[ v_s = 10\cos(10t) \, \text{V} \]
Notice the frequencies
Find:
The voltage across \( C \)
The current through \( L \)