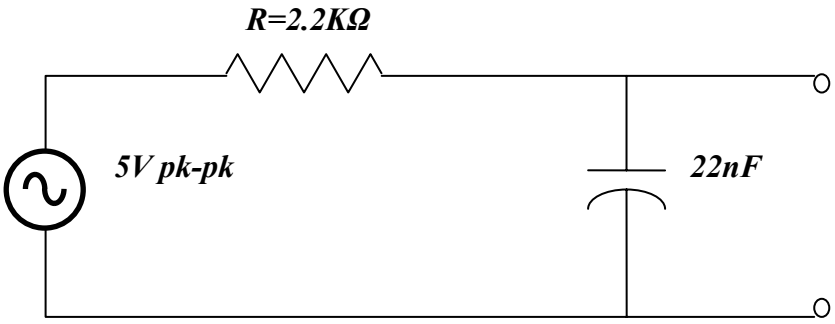
1BA5 Laboratory Experiment 4:

1) Connect the circuit shown in the following diagram:



2) Apply a sine wave input and make a superimposed plot of the input and output.

3) Determine the ratio Vout/Vin as a function of frequency starting at say 100Hz and finishing at 20KHz.

4) Plot your results on graph paper.

5) Determine the frequency at which Vout/Vin = 0.707 and verify this result theoretically.

6) Plot the phase difference between the input and output waveforms against frequency and verify that your results are consistent with your analysis of the circuit.

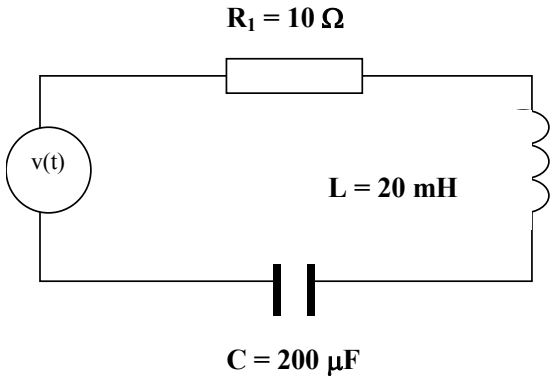
7) Interchange R and C and repeat 2) to 6) above.

8) These circuits are simple Low and High Pass filters respectively. Suggest some applications for them.

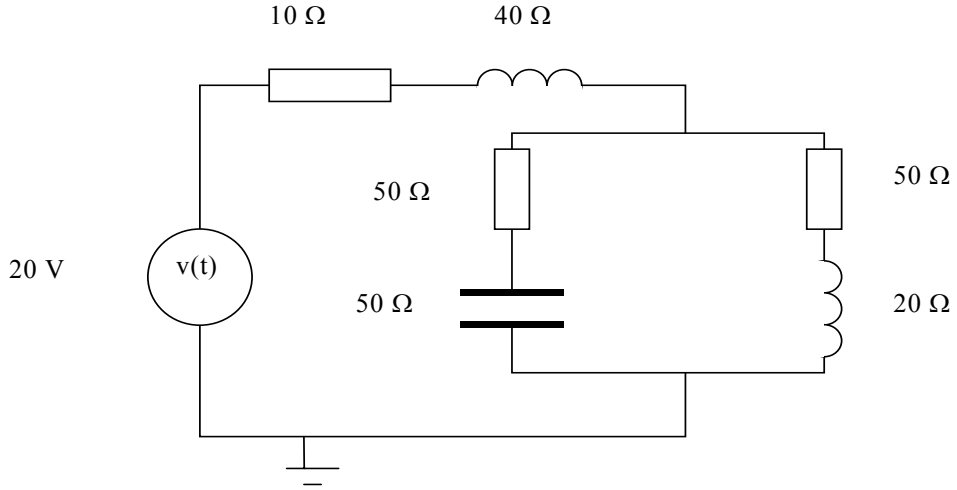
Exercises:

Complete the following exercises and include the solutions with your report:

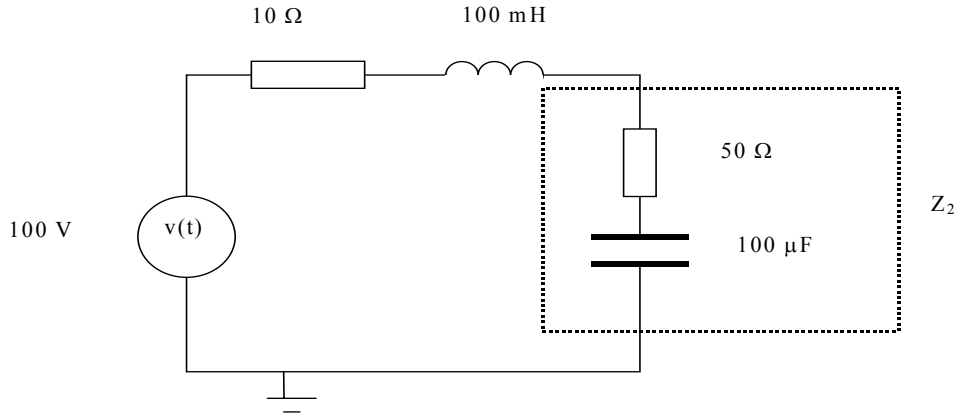
Q1.
What are the potential differences across the capacitor and the inductor in the following circuit? $\mathbf{V = 10 \angle 0^0}$ V supplied at 50 Hz.



Q2.
Calculate the impedance of the load in the following circuit?
What is the current drawn from the source?
Is the circuit capacitive or inductive?
What current is flowing in each branch of the circuit?



Q3.
In the following circuit calculate the voltage across Z. What current is flowing in the circuit? What energy is stored in the circuit? The supply frequency is 100 rad/s.



Laboratory Report:

Reports should be handed up at the subsequent laboratory session for your group.
Your name, group number and the date should be clearly indicated on the cover page.
The report should be written with a pen and be neat and concise (use a ruler for the circuit diagrams and tables). Explanations should be brief but complete.
Students should note that ~25% of marks are awarded for presentation, ~25% for explanation and interpretation of results and 50% for the exercises.
This report should be written on A4 paper – duly bound.