$Procedure:

Part A:from experiment 7:

1. provide 2 resistor (8.2, 1.8 kΩ) in the breadboard .
2. provide 2v AC voltage source by using the function generator as following :

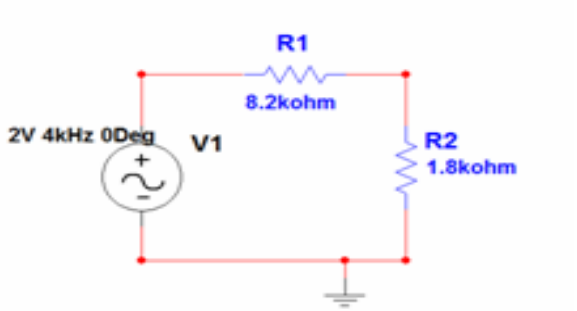
a. press the sinusoidal shape .

b. provide 4kHz frequency by pressing 10 kHz from the range & rotate the socket of the frequency using coarse & fine until reaching the desired value.

c. Connect the output socket in the F.G with ch1 of the Osill. & then rotate the output level until reaching 4Vp-p in the oscill screen.

d. Press the DC offset in the F.G & connect the output socket to the DMM(which provide to measured the voltage)& rotate the DC offset until we reach 3v in the DMM.

3.Connect the output socket with the circuit as shown in the Figure:



4.to measured the value of Vr1 :

* connect ch1 of the oscill between the voltage source & the ground.
* connect ch2 between R2 & the ground then press inverse(long press in the GD).
* press ch1 & see the place of it's ground by pressing ground beside it.
* press ch2 & make sure that it's ground same as in ch1.
* make sure that the volt/div in both channel is the same.

* finally press dual with ch2 to add the 2 signals & read the value of Vr1 from the oscill screen.

5. measured the value of Vr2:

* connect ch1 or ch2 between R2 & the ground then read the showed value.

6. determine the value of the phase θ:

* insert 10Ω in series with R2.

* connect ch1 between R2 &the ground & ch2 between 10 Ω & the ground.

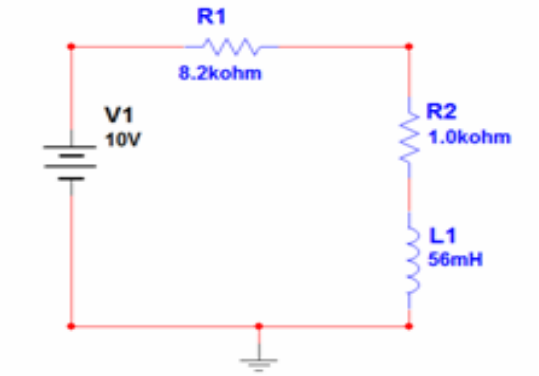
* press dual to show the two voltage in the same screen see if there is space between the peak of the two signals(here there is no space so the value of the phase θ =0)

Note:

1. You should make sure that the ground & the volt/div is the same when you measured Vr1.
2. You should insert small value of resistance in series with R2 to measured the value of θ.
3. Θ in pure resistive load = zero.
4. you can use resistors box to take the resistance of smalls values.

Part B :from experiment 6:

1. provide 2 resistors (8.2, 1kΩ) in the breadboard .
2. provide 10v DC voltage source by using power supply,
3. connect 56mH inductor (from the inductance box by rotate the suitable rotor to the desired value) with the circuit as shown in the figure :

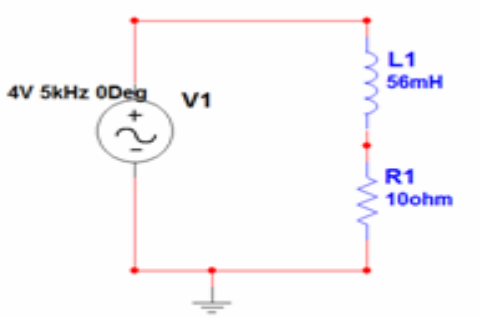


4. measured the values of Vr1, Vr2, VL, Vs by using DMM as we learn in the previous DC experiments.
5. disconnect the source from the circuit & measured the value of RL as in the DC measurements & recored the values.

NOTE: the inductor in the DC circuit is shown as short circuit so it's voltage will be zero.

Part C: from experiment 7:

1. connect 10 Ω resistance in series with 56mH inductors & fixed them in the breadboard.
2. provide AC voltage source by using F.G & oscill ***(as in partA)***but with 5kHz frequency & 4v source & zero DC offset as in the figure:



3. connect ch1 between the inductance & the ground & ch2 between R2 & the ground.
4. press dual to show the 2 signal in same time.
5. see the vertical distance between the two signal by using the cursors (it will appear in Hz so take the reciprocal of this value) then divided it by (1/frequency) & multiply it by 360.

θ = (distance between the top of the 2 signal /(1/f))*360

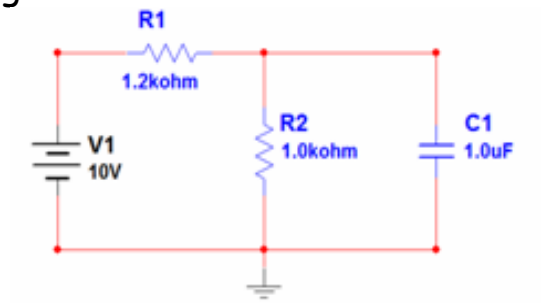
NOTE:

- θ of pure inductive =90 lagging.
- The value of the resistance in the circuit does not effect in the value of the θ because it's very small comparing with inductor.

- We can obtain the values of resistance & inductor by using inductor & resistance boxes.

Part D: from experiment 6:

1. provide 2 resistors (1.2, 1kΩ) in the breadboard .
2. provide 10v DC voltage source by using power supply,
3. connect 1ηF capacitor (from the capacitor box by rotate the suitable rotor to the desired value) with the circuit as shown in the figure :

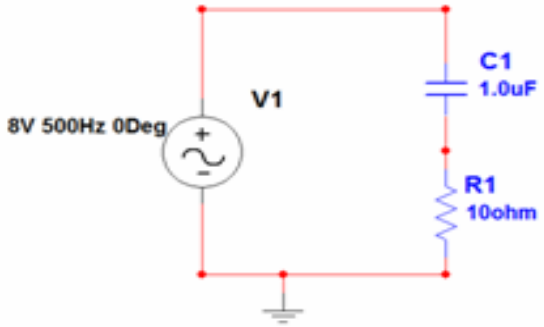


4. measured the values of Vr1, Vr2, Vc by using DMM as we learn in the previous DC experiments.
5. disconnect one terminal of the capacitor from the circuit & put it far away the measured capacitor current Ic as we learn in DC experiment then record the values.

NOTE: the capacitor in the DC circuit is shown as open circuit so it's current (Ic) will be zero & it's voltage same as Vr2.

Part E: from experiment 7:

1. connect 10 Ω resistance in series with 1ηF capacitor & fixed them in the breadboard.
2. provide AC voltage source by using F.G & oscill ***(as in partA)***but with 500Hz frequency & 8v source & zero DC offset as in the figure:



3. connect ch1 between the capacitor & the ground & ch2 between R1 & the ground.
4. press dual to show the 2 signal in same time.
5. see the vertical distance between the two signal by using the cursors (it will appear in Hz so take the reciprocal of this value) then divided it by (1/frequency) & multiply it by 360.

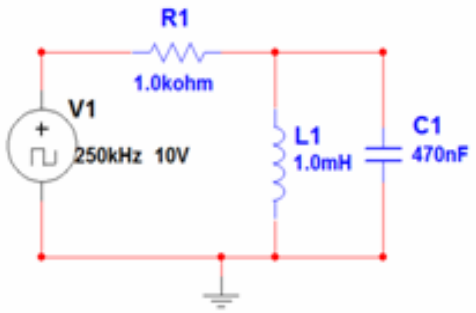
θ = (distance between the top of the 2 signal /(1/f))*360

NOTE:*θ of pure capacitor =90 leading.

- The value of the resistance in the circuit does not effect in the value of the θ because it's very small comparing with capacitor.
- We can obtain the values of resistance & capacitor by using capacitor & resistance boxes.

Part F: from experiment 6:

1. connect 1kΩ resistance in series with(0.47 ηF capacitor parallel with 1mH inductor)&fixed them in the breadboard.
2. provide AC voltage source by using F.G & oscill ***(as in partA)***but with 250kHz frequency & 5Vp-p source & zero DC offset & square shape as in the figure:



3. connect ch1 between the capacitor & the ground or between the inductor & the ground then measured the value of it's voltage.

Note:

- VL =VC
- The graph of the voltage will be damping sinusoidal.