Name: __________________________________ ID# _______________ Lab Section: ______

<u>PRE-LAB</u> [**To be completed and submitted before performing Lab # 3**]

(<u>Weight</u>: 10%)

(1) A sinusoidal voltage signal has the peak-to-peak value V_{pp} and a frequency f Hz. On an oscilloscope display, the above signal appears to be 'time-shifted' by Δt sec with respect to another signal having the same frequency .

V_{pp} =………………………. Volts, f = …………………Hz.,
Δt =…………………….sec

For **<u>your choice</u>** of V_{pp} , f and Δt determine

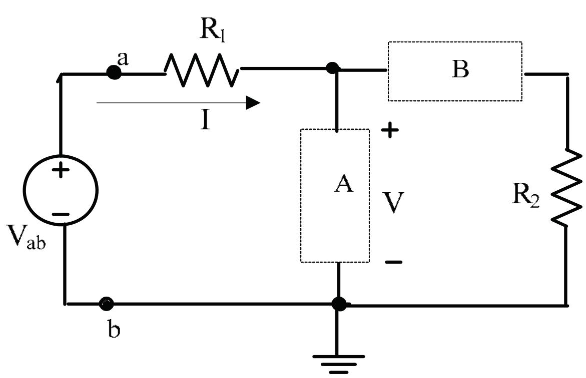
(a) the RMS value V_{RMS} = ……………. Volts

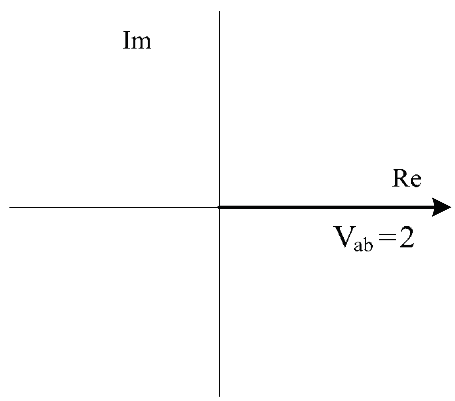
(b) the Period T = ………………………sec

(c) the radian frequency ω =…………………radians/sec

(d) the 'phase-shift' between the two signals is θ = ...degrees

(2): For the circuit shown R_1= 500Ω and R_2 = 1000Ω . The components A and B (within the dotted outlines) may be capacitors (C)in the range of 100–300 nF or inductors (L) in the range of 20-50 mH. The frequency of operation is in the range of 2000–5000Hz. and V_{ab} = 2 volts RMS.





Indicate the (L and/or C) component of **<u>your choice</u>** for A & B within the dotted outlines (with values) and the frequency f = ………………..Hz. <u>and</u> <u>determine</u>, **by calculation,**

(a) the impedance (in polar form) connected to the source, Z_{ab}= = …. ∠ … , Ohms

(b) the phasor current I = …………………………..A/mA

(c) sketch the phasor diagram showing I and V , with V_{ab} as reference.
[<u>Hint:</u> Obtain V using KVL: $V = V_{ab} - IR_1$]
<u>Show all calculations below (neatly!) :</u>

continued overleaf >>>>

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(3) Assume that you have constructed the circuit setup of Figure 3.9, with frequency f adjusted to 4kHz. and that the measurements obtained from the printout (Step 6)were as follows: :

V_1 = ……………..volts [<u>**choose**</u> between 4 & 6 V RMS]

V_2 = ……………..volts [<u>**choose**</u> between 500mV& 800mV RMS] with V_2 lagging V_1.

and the timeshift between the two waveforms is

Δt = ………………μs [<u>**choose**</u> between 20 & 40 μs]

<u>**Determine**</u> :

(a) the magnitude of the unknown impedance Z = (…… … j …….) = ….. ∠ … <u>from the hypothetical values assumed above.</u>

(b)the 'nature' of the impedance : Inductive / Capacitive (<u>Circle the answer</u>)

<u>Show all calculations below (neatly!) :</u>

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