print name (first last): _____

course: EET 337 2025/07/26

Impedance Combination

Performance Checks	Prelab	Performance
		In lab or Late
_____ 1. Impedance Combination – *E1* – measurements	_____(10%)	____(30% or 15%)
_____ 2. Impedance Combination – *E2* – measurements		____(30% or 15%)

Lab Performance Scoresheet

Prelab initial submission (on time, with calculations, complete) … (10%)→ _____

All required signed ***Performance check offs*** …… (60%)→ _____

Final Performance Grade %, (maximum = 70%) → _____

The other 30% are for the report that is submitted on Blackboard.

Prelab Calculations

Only watch the **first 3:15 minutes** of the video.

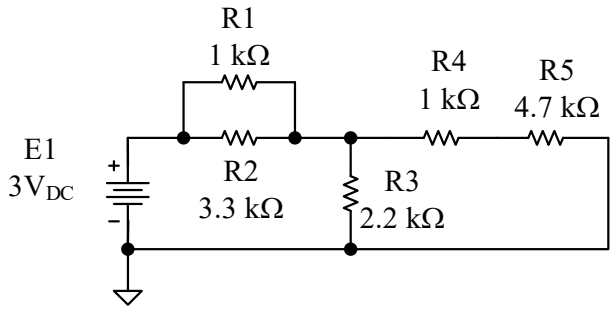


Figure 1 Circuit for analysis by impedance combination

a. Using impedance combination, create a *plan* to calculate the ***voltage across R3***. Write your *equations*, in order, in the left column of Table 1.

b. Once your plan is complete, perform the calculations in the right column of Table 1. Use the *nominal* values. Carry four significant digits.

Table 1 Impedance combination calculations – Figure 1

Plan	Calculations

Objectives

Calculate and measure the voltages within a series-parallel network using impedance combination for a single source network.

Approach and Results

1. Impedance Combination

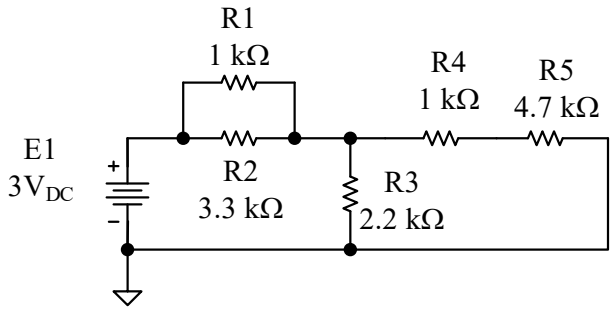


Figure 1 Circuit for analysis by impedance combination

Table 2 Component values

	nominal	actual
R1 (kΩ)	1.0	
R2 (kΩ)	3.3	
R3 (kΩ)	2.2	
R4 (kΩ)	1.0	
R5 (kΩ)	4.7	

a. Measure each of the components you use in Figure 1 on your meter's most sensitive range. Remove each component completely from the circuit when measuring its resistance. Record all stable digits in Table 2. Then replace that resistor and remove the next to be measured.

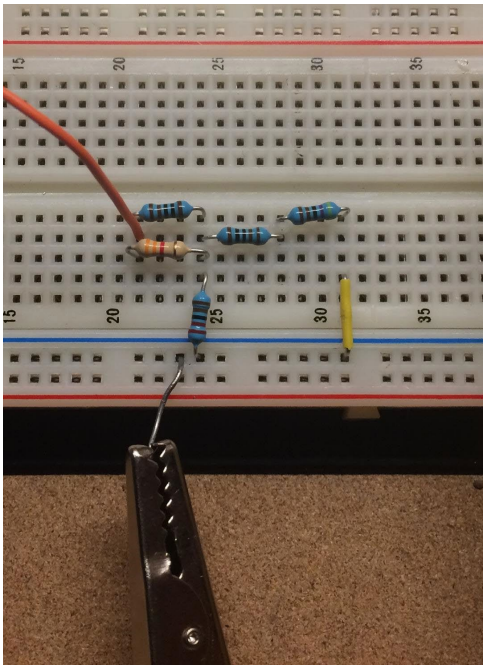


Figure 2 Circuit for analysis by impedance combination

When measuring with the digital multimeter, assure that both leads are *clipped* into the circuit so that you do not have to hold the probes.

b. You may use the Agilent generator as shown in the Prelab video, or the Oscilloscope's Wave Generator. To apply a DC voltage from the oscilloscope's Wave Generator, turn the instrument **on**. Select the **Wave** button. Using the soft keys, select **DC**, and **Hi-Z.**

c. Adjust the voltage from the source to 3.00 V_{DC}, as measured with a digital multimeter.

d. Using the digital multimeter, verify that the voltage across R3 is within 5% of that calculated using the *measured* component values from section 1.

Table 3 Impedance combination performance – Figure 1

	Theory V_{DC}	Video V_{DC}	Actual V_{DC}	Error %
V_{R3}				

e. Press the **Wave** button or the **Output** button again to disable the DC output.

Instructor checkoff

2. Impedance Combination – Manual Calculation – Figure 3

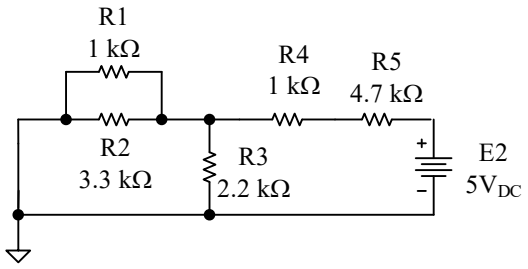


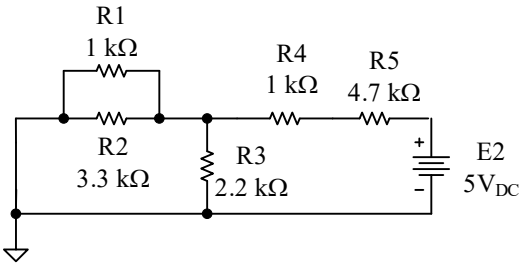
Figure 3 Second circuit for analysis by impedance combination

a. Using impedance combination, create a *plan* to calculate the ***voltage across R3***. Write your *equations*, in order, in the left column of Table 4.

b. Once your plan is complete, perform the calculations in the right column of Table 4. Use the *actual* values from Table 2.

Table 4 Impedance combination calculations – Figure 3

3. Impedance Combination – Measurements – Figure 3



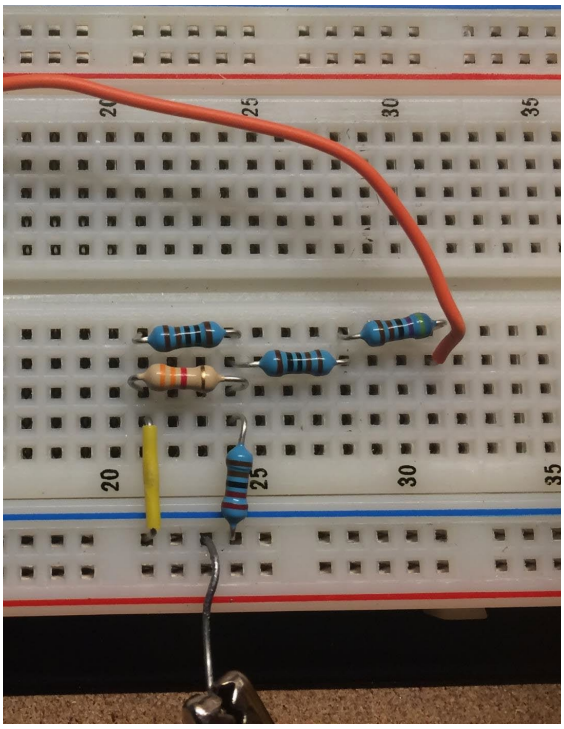


Figure 4 Circuit for analysis by impedance combination

a. Rearrange your circuit from Figure 1 to match that shown in Figures 3 and 4.

b. Use the multimeter to adjust E2 to 5.00 V_{DC}.

c. Move the multimeter to across R3. Measure the V_{DC} of V_{R3}.

d. When the voltage across R3 is within ± 5% of that calculated, record these values in Table 5.

Table 5 Impedance combination performance – Figure 4

	Theory V_{DC}	Actual V_{DC}	Error %
V_{R3}			

Instructor checkoff

Approach and Results

Write two paragraphs. In the first, explain why it is important to record your plan *fully* before beginning *any* calculations. In the second paragraph, discuss sources of errors and ways to reduce them.