Using MultiSim7 On MSIM7Lab01DC
How to Get A Component

1) Left Click on the component, DC Voltage Source symbol, then move the mouse down to the desired position.
2) Left click to place.
1) Follow the previous slide instructions and apply to all the components above.
1) Double click on the component, R2.
2) Change the value to the desired value, 1.5
1) Double click on the component, R3.
2) Change the value to the desired value, 150.
3) Click on down arrow, change unit to Ohm
Rotate A Component

1) Click on the component, R2, until four corners highlighted.
2) Click on Edit/90 Clockwise menu to rotate.
Connecting Components

1) Move the mouse to positive terminal of the power supply, starting point, until it become target symbol.
2) Left click to start the wire.
Wiring (connect components together)

1) Move the mouse to the left side of R1 then left click.
Get Multimeter
Get Multimeter

1) Click on Agilent Multimeter icon and drag it to desired position.
2) Click on XMM1.
Meter panel reflects XMM1 ICON terminals

Measurement types: Voltage, Resistance, Diode

Common

Measurement types: Current
Set To Measure DC

1) Click DC V button.
Measure VDC at point $V_B$

1) Click on DC V button.
2) Connect the **positive** lead connects to point $B$, **negative** lead connects to ground to measure the potential difference between $V_B$ and $0V$.
3) Click on Run button at upper left corner.
4) The reading is $V_B$.
5) $V_B = V_B - 0V = 7.47\, V$
Recording $V_B$ to The Table

<table>
<thead>
<tr>
<th>Unit</th>
<th>DMM voltages measurement</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt</td>
<td>7.47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>7470</td>
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</table>

MSIM7LAB Instruction:
1. Run MSIM7 for the above circuit. See HELP work sheet
2. Using DMM to measure and record values into the following tables.
3. If the Status box PASS, upload this file for your credit.

Reading from the meter.

Convert from Volt to mili-volts (multiply by 1000)

$7.47 \text{ V} = 7470 \text{ mV}$
Measure Vc

1) Make sure stop running simulation before you can modify the circuit.
2) Connect **Positive** lead to point C and **negative** lead to ground to measure the potential difference between Vc and 0V.

2) Click on Run button.
3) The reading is VC = VC − 0V = 679.25 mV
### Recording Vc

<table>
<thead>
<tr>
<th>Unit</th>
<th>VB</th>
<th>VC</th>
<th>VR1</th>
<th>VR2</th>
<th>VR3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volt</td>
<td>7.47</td>
<td>0.679</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mVolt</td>
<td>7470</td>
<td>679.25</td>
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</table>

Convert from mili-volts to Volt (divide by 1000)

679.25 mV / 1000 = 0.679

Reading from the meter.
1) $V_{R1}$ is the potential difference between two ends of $R1$.  
2) Other words, the potential difference between $V_A$ and $V_B$.  
3) $V_{R1} = V_A - V_B = 12 \text{ V} - 7.47 \text{ V} = 4.53 \text{ V}$  

4) Make sure stop running simulation before you can modify the circuit.  
5) Connect **Positive** lead to the left of $R1$ and **negative** lead to the right of $R1$ to measure $VR1$.  
6) Click on Run button.  
7) The reading is $V_{R1} = 4.528 \text{ V}$
Recording $V_{R1}$

<table>
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</table>

**DMM Current measurement**

- **IR1**

**Calculate Power at R3 (PR3)**

- **mWatt**

**Calculate Total resistance RT**

- **ohm**
Measure $V_2$

1) $V_{R1}$ is the potential difference between two ends of R2.
2) Other words, the potential difference between $V_B$ and $V_C$.
3) $V_{R1} = V_B - V_C = 7.47 \, \text{V} - 0.679 \, \text{V} = 6.79 \, \text{V}$

4) Make sure stop running simulation before you can modify the circuit.
5) Connect **Positive** lead to the top of R2 and **negative** lead to the bottom of R2 to measure $V_{R2}$.
6) Click on Run button.
7) The reading is $V_{R2} = 6.792 \, \text{V}$
## Recording $V_{R2}$

<table>
<thead>
<tr>
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<td>VR1</td>
<td>VR2</td>
<td>VR3</td>
</tr>
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<td>Volt</td>
<td>7.47</td>
<td>0.679</td>
<td>4.53</td>
<td>6.79</td>
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<tr>
<td>mVolt</td>
<td>7,470</td>
<td>679.25</td>
<td>4,530</td>
<td>6,790</td>
<td></td>
</tr>
</tbody>
</table>

### DMM Current measure
- IR1
- mAmp
- microA

### Calculate Power at R3 (PR3)
- mWatt

### Calculate Total resistance RT
- ohm
1) \( V_{R3} \) is the potential difference between two ends of R3.

2) Other words, the potential difference between \( V_C \) and Ground (0V).

3) \( V_{R3} = V_C - 0V = 0.679 V - 0V = 0.679 V. \)

4) Make sure stop running simulation before you can modify the circuit.

5) Connect **Positive** lead to the left of R3 and **negative** lead to the right of R3 to measure \( V_{R3} \).

6) Click on Run button.

7) The reading is \( V_{R3} = 679.2 \text{ mV} \)
# Recording $V_{R3}$

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**DMM Current measure**

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**Calculate Power at R3 (PR3)**

<table>
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<tr>
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**Calculate Total resistance RT**

| ohm   |
Use Shift Key to Activate Second Function

1) Click On Shift button.
2) Click on DC I button (DC V second function).

3) The unit should be in ADC.
1) Make sure stop running simulation before you can modify the circuit.
2) Break the circuit by deleting wire between positive terminal of power supply and the left of R1.
3) Connect Positive, Red lead from I terminal of the meter to the positive of power supply.
4) Connect Common, black lead from the meter to the right of R1.
5) Click on Run button.
6) The reading is $I_{R1} = 4.528$ mA
1) Convert mAmp to microA by multiply by 1000.
Calculate power

• P is Power. \( P = RI^2 \)

• \( R = 150 \ \Omega \)
• \( I = 4.53 \ \text{mA} = 0.00453 \ \text{A} \)
• \( P = 150\Omega (0.00453\text{A})^2 = 0.0031 \ \text{W} \)
  = 3.1 \ \text{mW} \)
Record Calculated Power for R3

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Calculate Power at R3 (PR3)
| mWatt | 3.1 |

Calculate Total resistance RT
| ohm    |     |
Calculate RT

- RT = R1 + R2 + R3
- R1 = 1kΩ = 1kΩ × (1000) = 1000Ω
- R2 = 1.5kΩ = 1.5kΩ × (1500) = 1500Ω
- R3 = 150Ω
- RT = 1000Ω + 1500Ω + 150Ω
  = 2650Ω
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<td>Calculate Total resistance RT</td>
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<tr>
<td>ohm</td>
<td>2650</td>
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PASS

DC circuit diagram with the following components:
- A to R1 to B
- V1 connected to the left side of R1 (12 V)
- R2 connected to the right side of R1 (1.5 kOhm)
- R3 connected to C (150 Ohm)

NOTE: Make sure enter your name