

## ECE101-1L – BASIC ELECTRONICS

### Activity #1b: Diode Test and Familiarization

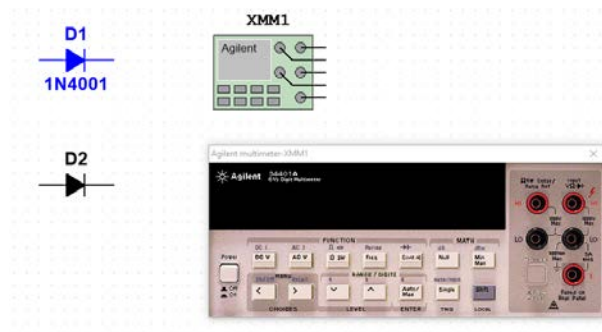
#### Objectives:

- Use a Multimeter to examine dc current flow through a diode during reverse and forward bias in different circuit configuration
- Familiarized with Multimeter Functions (Diode Test)
- Use Multisim and TinkerCAD for the Activity

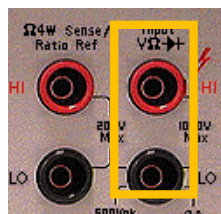
#### Procedures:

##### Part A. Multisim

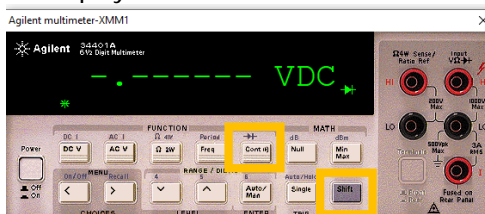
1. Open Multisim
2. Place a component in your workspace
  - a. Diode 1N4001
  - b. IDEAL Diode
  - c. Agilent Multimeter (We will use Agilent multimeter since it has a diode test function which is common to multimeter nowadays)
3. Workspace should be like this:



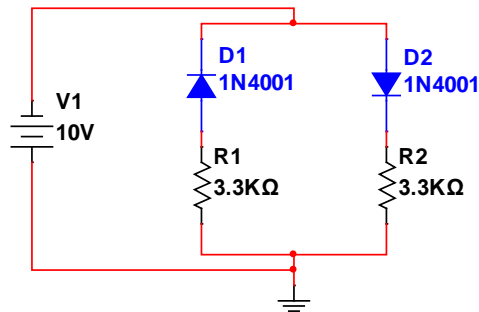
4. Probe/Connect the Red Terminal (HI) (V  $\Omega$  Diode) Symbol to the Anode terminal of the Diode (1N4001) and the Black Terminal (LO) (Below the Red you used) to the Cathode Terminal of the Diode.



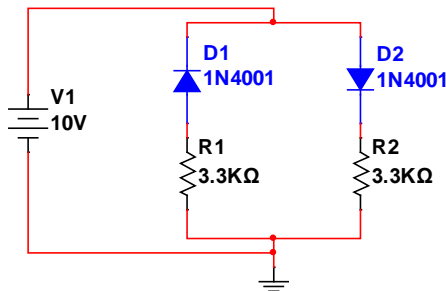
- a. Screenshot your Connection
5. Turn on the Agilent Power on and Press Shift->Cont. This will activate the Multimeter function to Diode Test Function. Your LCD display should look like this



6. Run the Simulation (F5) or click the Green Play Button
  - a. Screenshot the Voltage Reading
  - b. What Conduction state does the meter reading indicate? (Forward Bias or Reverse Bias)
7. Swap the Red and Black Terminals by connecting the Red Terminal to the Cathode and the Black Terminal to the Anode of the Diode. Run the Simulation
  - a. Screenshot the diagram
  - b. Screenshot the Voltage Reading
  - c. What Conduction state does the meter reading indicate? (Forward Bias or Reverse Bias)
8. Create the Schematic diagram shown below



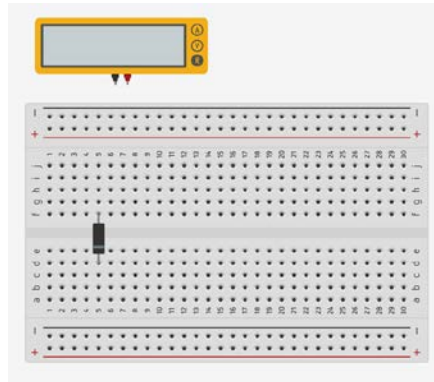
9. Measure the Voltage across R1 and R2, Screenshot the Voltage Reading across
  - a. R1
  - b. R2
  - c. Identify Which diode is forward biased?  
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  - d. Identify Which diode is reverse biased?  
\_\_\_\_\_
10. Flip the Voltage Supply similar to the schematic diagram below



11. Measure the Voltage across R1 and R2, Screenshot the Voltage Reading across
  - a. R1
  - b. R2
  - c. Identify Which diode is forward biased?  
\_\_\_\_\_
  - d. Identify Which diode is reverse biased?  
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## Part B. TinkerCAD

1. Open TinkerCAD and Create a New Circuit
2. Place a Breadboard, Diode and Multimeter



3. Identify which is the Cathode and Anode of the Diode  


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4. Connect the Red Terminal to the Anode and the Black terminal to the Cathode of the diode
5. Run the simulation (make sure the Multimeter is in  $\Omega$  or Resistance Function
  - a. Screenshot the schematic
  - b. Screenshot the Multimeter Readings
  - c. Base on the reading of multimeter is the diode forward or reverse biased?

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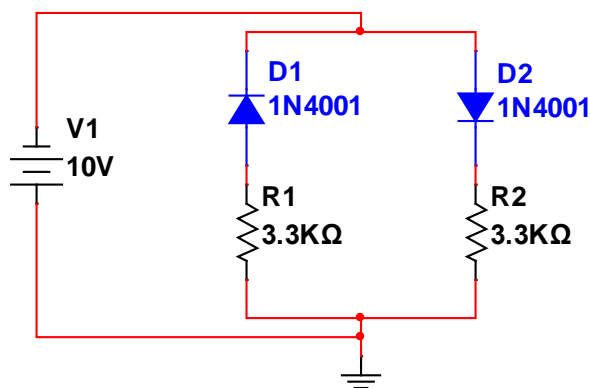


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6. Connect the Black Terminal to the Anode and the Red terminal to the Cathode of the diode
7. Run the simulation (make sure the Multimeter is in  $\Omega$  or Resistance Function
  - a. Screenshot the schematic
  - b. Screenshot the Multimeter Readings
  - c. Base on the reading of multimeter is the diode forward or reverse biased?

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8. Using **TinkerCAD** Create the Schematic diagram shown below

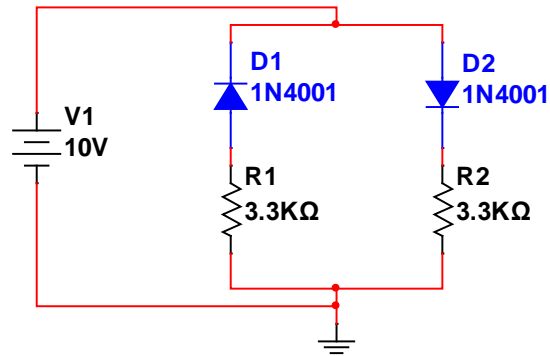


9. Measure the Voltage across R1 and R2, Screenshot the Voltage Reading across

- e. R1
- f. R2
- g. Identify Which diode is forward biased?

h. Identify Which diode is reverse biased?

10. Flip the Voltage Supply similar to the schematic diagram below



11. Measure the Voltage across R1 and R2, Screenshot the Voltage Reading across

- i. R1
- j. R2
- k. Identify Which diode is forward biased?

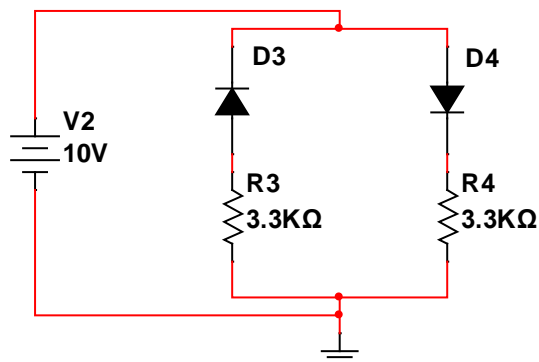
l. Identify Which diode is reverse biased?

## Questions and Problems

1. CD800a Multimeter is shown below, at which selector should be place in order to measure / test a Diode?



2. Consider the schematic shown below (use DIODE VIRTUAL / IDEAL DIODE)
  - a. **CALCULATE** the current flowing through the resistor
  - b. Verify the results using Multisim
  - c. Verify the results using TinkerCAD



**Discussions:**

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