EASTERN MEDITERRANEAN UNIVERSITY

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

EENG341 LAB
ELECTRONICS I

EXPERIMENT 1
THE SEMICONDUCTOR DIODE

Std. No. Name & Surname:
1 _______ ______________________
2 _______ ______________________
3 _______ ______________________

Group No :____________________
Submitted to:__________________
Date :____________________
**Objectives:**
- To recognize diodes in various physical forms.
- To determine the diode polarity and to understand the need for correct connection.
- To obtain knowledge of the forward voltage/current characteristic and the conduction voltage for germanium and silicon types.

**Determining Diode Polarity:**
- Construct the circuit of Fig. 1.1. Note that the resistor limits the current to a safe value.

![Fig. 1.1](image1.png)

- Record your result in Table 1.1.
- Now, switch off the power supply and reverse the BYX36 diode to give the circuit of Fig. 1.2.

![Fig. 1.2](image2.png)

- Switch on the power supply and readjust the voltage to 10V.
- Read the new value of diode current and record it in the second row of your Table. 1.1.
The Characteristics of Forward Biased Diodes:

- Construct the circuit of Fig. 1.3. The 2.2kΩ potentiometer will provide fine control over the applied voltage.

\[ V_d = V_s - V_r \quad \text{and} \quad V_r = I_f \times 100 \]

\[ I_f = \frac{V_r}{100} A \]

\[ = \frac{V_r}{100} \times 1000mA \]

\[ \therefore I_f = 10V_r mA. \]

- Turn the potentiometer to zero (It should be fully clockwise.). Switch on the power supply and adjust it to supply 20V.
- Adjust the potentiometer to give a voltage of 1V on the voltmeter showing \( V_s \). Now use the power supply variable control to set \( V_s \) to:
  
  0, 0.1V, 0.2V, etc, up to 1.0V.

- Note \( V_r \) for each setting and enter it in your Table 1.2.
- Now, with the power supply variable control set the supply to 20V and use the potentiometer to set \( V_s \) to:
  
  1.5V, 2.0V, 3.0V.
Again enter the values of $V_r$ in your Table 1.2.

- Calculate $V_d$ and $I_f$. Enter these in Table 1.2.

**Table 1.2.**

<table>
<thead>
<tr>
<th>$V_s$ (V)</th>
<th>$V_r$ (V)</th>
<th>$V_d = V_s - V_r$ (V)</th>
<th>$I_f = 10V_r$ (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0.1</td>
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<td></td>
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<tr>
<td>0.2</td>
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<tr>
<td>0.3</td>
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<td>0.4</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<tr>
<td>3.0</td>
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</tbody>
</table>

**Questions:**

1. Which side of the diode should be connected to the positive voltage supply to make it conduct current?

2. When the diode polarities were changed was the current …
   a. Slightly smaller or
   b. Much smaller or
   c. Too small to measure?

3. Use the results obtained in Table 1.2 and construct the graph shown in Fig. 1.4.

4. What is the relationship between current and voltage shown in Fig. 1.4?
5. At what approximate value of $V_d$ does the current $I_f$ begin to rise noticeably?

6. Does $V_d$ rise much above this value for large values of $I_f$?

**CONCLUSIONS:**