

HACETTEPE UNIVERSITY

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

ELE 112 INTRODUCTION TO ELECTRICAL ENGINEERING LABORATORY

EXPERIMENT #5

EXAMINING BASIC CHARACTERISTICS OF A DIODE IN DC CIRCUITS

**Objective:** To perform diode testing, and examine the forward bias and reverse bias operations of diodes.

**Theory:** The details are given in the ELE110 Introduction to Electrical Engineering course notes.

## 2. EXPERIMENTAL WORK

**2.1** Perform diode testing procedure and determine if the given diodes are functioning properly or not.

**2.2** Set up the circuit in *Fig. 1*. Adjust the potentiometer till you get 0V, 0.3V, 0.5V, 0.7V, 1V, 1.5V, 2V and 2.5V voltage values between point a and point b, respectively. Measure the value of the voltage  $V_D$ , and the current  $I_D$ . After measurement of  $V_D$  and  $I_D$  values, plot  $I_D$ - $V_D$  curve of the diode. And try to determine the forward bias voltage of the diode.

**2.3** Set up the circuit in *Fig. 2*. Adjust the potentiometer till you get 0V, 0.3V, 0.5V, 0.7V, 1V, 1.5V, 2V and 2.5V voltage values between point a and point b, respectively, measure the value of the voltage  $V_D$ , and the current  $I_D$ .

**2.4** Replace the basic diode (1N4007) with the LED and repeat parts 2.2 and 2.3.

## 3. RESULTS AND CONCLUSION

**3.1** Using the results in 2.1 and 2.2, find the internal resistance of the diode for each input voltage value. Does the resistance change at each voltage level?

**3.2** Using the results in 2.3, can you consider the circuit in Fig. 2 as open-circuit?

**3.3** Repeat parts 3.1 and 3.2 for the results found in 2.4.

**3.4** Compare the theoretical and practical results, and comment on them briefly.

## EQUIPMENTS AND COMPONENTS

DC battery

AVO meter

Resistors: 1k $\Omega$  (#1), 1k $\Omega$  pot

Diodes: 1N4007 (#1), LED (#1)