

## DIODES AND THEIR APPLICATIONS

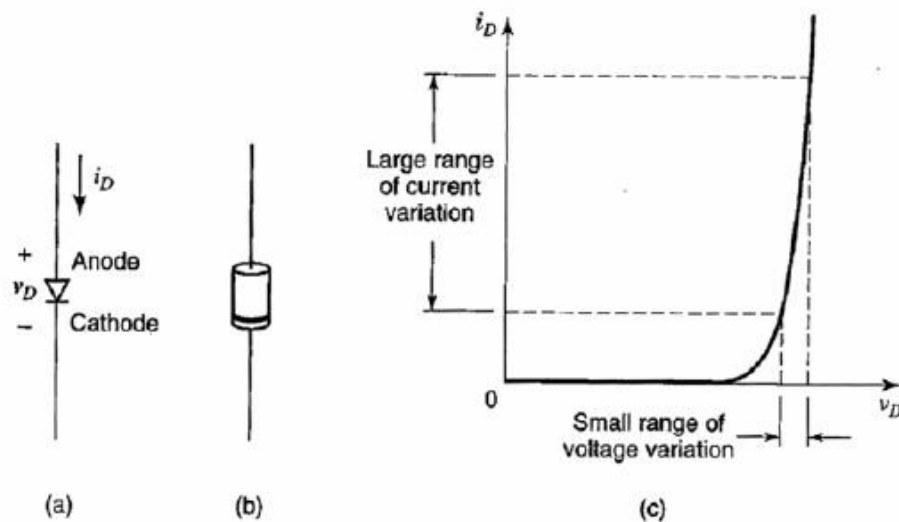
### I. DESCRIPTION AND OBJECTIVE

In this experiment, you will study the current-voltage characteristics of diodes, build rectifier circuits and study small signal dynamic resistance of a diode.

### II. GENERAL CIRCUIT DISCUSSION

A diode is a two-terminal element, usually made by using a pn junction. In this lab, we are concerned only with the external (voltage-current) characteristics of diodes. The symbol for a diode is shown in Fig. 1(a). Which terminal is which matters very much in a diode. Usually, the terminal indicated by a horizontal line in Fig. 1(a), called the cathode, is marked on a real diode; see, for example, Fig. 1(b). We define the voltage ( $v_D$ ) and the current ( $i_D$ ) of a diode as shown in the figure. These two quantities are related, as shown in figure Fig. 1(c). When the voltage  $v_D$  is positive, the diode is said to be forward-biased; a large current can then flow, and the diode is said to conduct. When the voltage  $v_D$  is negative, the diode is said to be reverse-biased; the diode current is extremely small, and for our purposes it is assumed to be zero; the diode is then said to be turned off. Thus, the diode effectively conducts current in only one direction (downward in Fig. 1); it "refuses" to conduct current in the other direction. This property turns out to be very useful, as you will find out in this experiment.

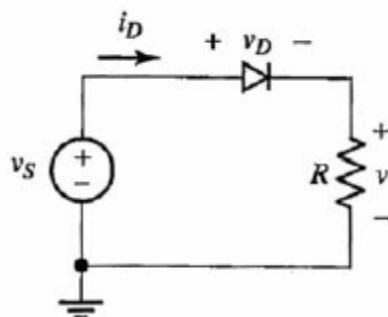
**Fig. 1**



### METHOD:

1. Set up the circuit shown in figure 2.

**Fig. 2**



2. Measure the necessary current-voltage values and fill the table.
3. Change the poles of your power supply. In this case the values will be negative so also change the multimeter to -DC mode.
4. Repeat the step 2 and fill the table.
5. Plot  $I-V_2$  graph for both cases on the same graphical paper.

Table 1

Right Direction				Reverse Direction			
Set Voltage	$V_s$	$V_D$	$I = (V_s - V_D)/R$	Set Voltage	$V_s$	$V_D$	$I = (V_s - V_D)/R$
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			
9				9			