BE LAB TASK # 08

NAME : Shahmeer khan.

Class ID:106293.

Student ID: 12113.

Topic: SEMICONDUCTOR DIODE.

Task:

Basic Concepts:

1) ***Diode has an unique ability to pass current in one direction only.***
2) ***Diode cane behaves as an open circuit and short circuit.***

OBSERVATIONS/CALCULATIONS:

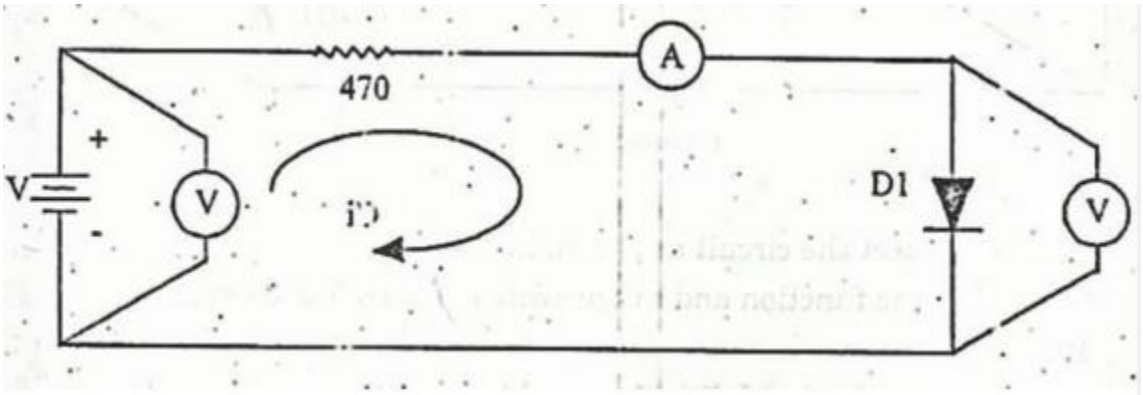
OBJECTIVES:

- ***To Study the V-I characteristics of a Semi-Conductor Diode.***

THE IDEAL DIODE:

We begin out study of circuits by considering models of linear elements, the simple of these being the resistor. The volt-ampere (v-I) characteristics of the ideal resistor is described by such a simple relation, (Ohm Law) that we sometimes lose sight of its graphical interpretation. The linear character of Physical Diode has inherent characteristics and limitation that cause them to differ from the ideal. These are to be studies in the following experiment.

FORWARD BIASED:



When Diode is forward biased its P Terminal is connected to higher potential and n type is connected to lower potential. Diode behaves a short circuit and infinite Resistance can pass through it without any voltage drop Cross it.

That is it has zero forward resistance and no forward drop. The characteristics curve is a straight line that start from the origin and ride vertically along the +ve y axis.

Diode Voltage (Vd)	Diode Current (Id)	Dc Supply Voltage (Vs)	Diode Forward Resistance	Power Dissipation in Diode	Power Dissipated in Resistor	Power Supply
341.153 mV	0.125 mA	0.4	2.73 ohms	0.05 mW	7.34 mW	7.39 mW
435.437 mV	0.776 mA	0.8	0.57 ohms	0.62 mW	284 mW	284.62 mW
471.26 mV	1.551 mA	1.2	0.31 ohms	1.86 mW	1131 mW	1132.86 mW
492.891 mV	2.356 mA	1.6	0.21 ohms	3.76 mW	2609 mW	2612.76 mW
508.314 mV	3.174 mA	2	0.17 ohms	6.34 mW	4735 mW	4741.34 mW
520.274 mV	3.999 mA	2.4	0.14 ohms	9.59 mW	7517 mW	7526.59 mW

530.032 mV	4.83 mA	2.8	0.11 ohms	13.52 mW	10965 mW	10978.52 mW
538.238 mV	5.663 mA	3.2	0.09 ohms	18.12 mW	15073 mW	15091.12 mW
545.39 mV	6.499 mA	3.6	0.08 ohms	23.39 mW	19852 mW	19875.39 mW
551.661 mV	7.337 mA	4	0.07 ohms	29.34 mW	25301 mW	25330.34 mW

For Calculations Formulas Used:

*For Resistance (4th Column):

Rd=Vd/Id

*For Power Dissipation in Diode (5th Column):

P=Vs*Id

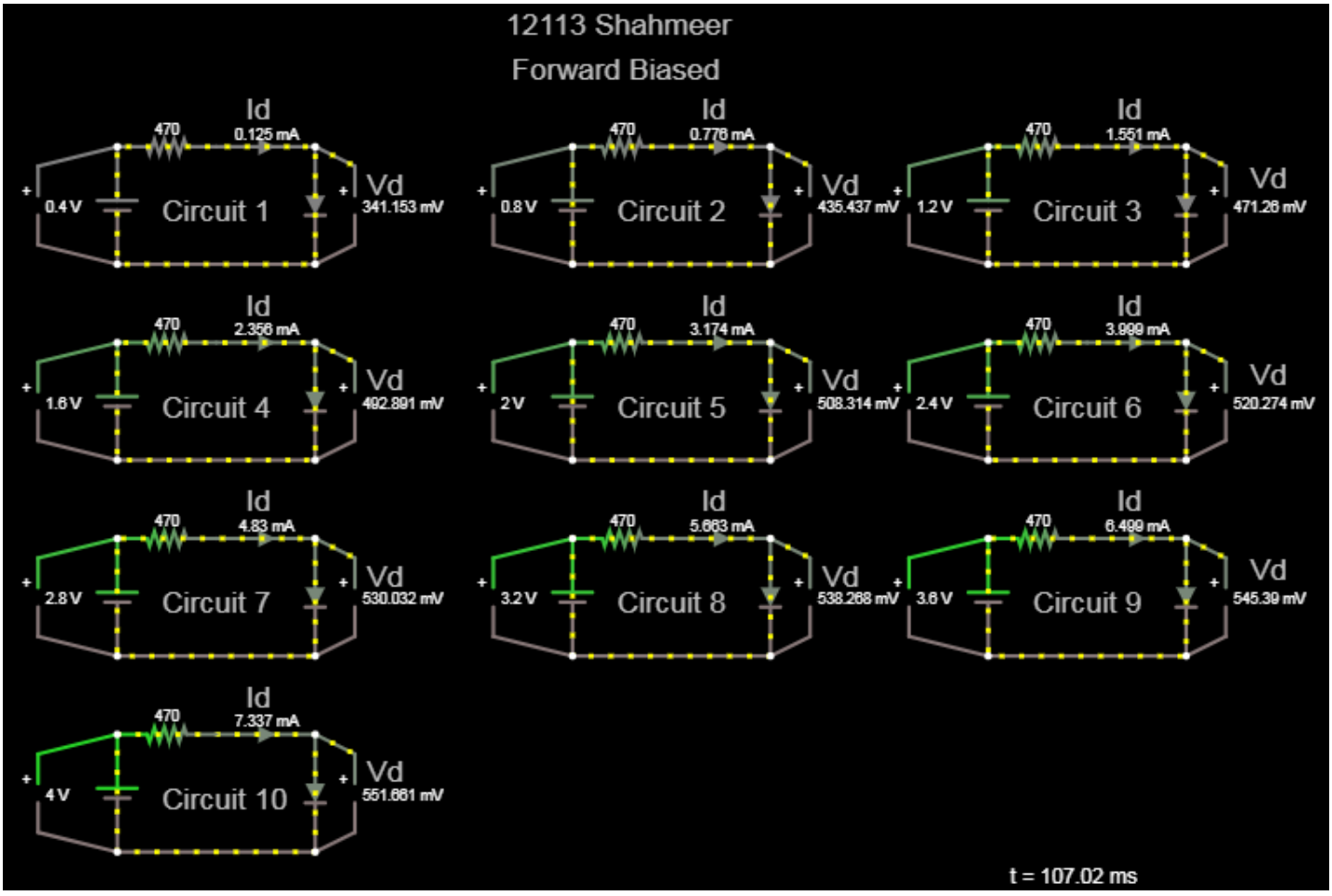
*For Power Dissipated in Resistors (6th Column):

P=Rx(Id^2). Here R=740.

*For power Supply (7th Column):

P= Pd (5th column values row wise) + Pr (6th column values row wise)

Screenshot:



Link:

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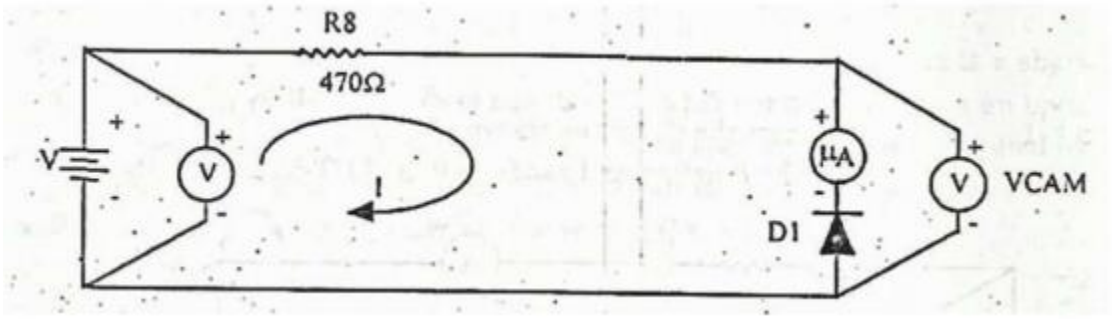
REVERSE BIASED:



When Diode is Reverse biased its cathode is at higher potential than anode. Then the diode behaves as an open circuit and no current pass through it and all the applied voltage appear across it. That is diode Reverse Resistance is infinite and reverse current is zero. The characteristics curve is a straight line on y-axis extending to left.

Diode Reverse Voltage (Vd)	Diode Reverse Current (Id)	Dc Supply Voltage (Vs)	Diode resistance Resistance	Power Dissipation in Diode	Power Dissipated in Resistor	Power Supply
399.919 mV	0.000173 mA	0.4	2312 ohms	0.0000692 mW	0.000014 mW	0.00008 mW
799.919 mV	0.000174 mA	0.8	4598 ohms	0.0001392 mW	0.000015 mW	0.00015 mW
1199.919 mV	0.000174 mA	1.2	6897 ohms	0.0002088 mW	0.000015 mW	0.00022 mW
1599.919 mV	0.000174 mA	1.6	9195 ohms	0.0002784 mW	0.000015 mW	0.00029 mW
1999.919 mV	0.000174 mA	2	11494 ohms	0.000348 mW	0.000015 mW	0.00036 mW
2399.919 mV	0.000174 mA	2.4	13793 ohms	0.0004176 mW	0.000015 mW	0.00043 mW
2799.919 mV	0.000174 mA	2.8	16092 ohms	0.0004872 mW	0.000015 mW	0.00051 mW
3199.91	0.00017	3.2	18391	0.0005568	0.000015	0.00057

9 mV	4 mA		ohms	mW	mW	mW
3599.91 9 mV	0.00017 4 mA	3.6	20690 ohms	0.0006264 mW	0.000015 mW	0.00064 mW
3999.91 9 mV	0.00017 4 mA	4	22989 ohms	0.000696 mW	0.000015 mW	0.00071 1 mW

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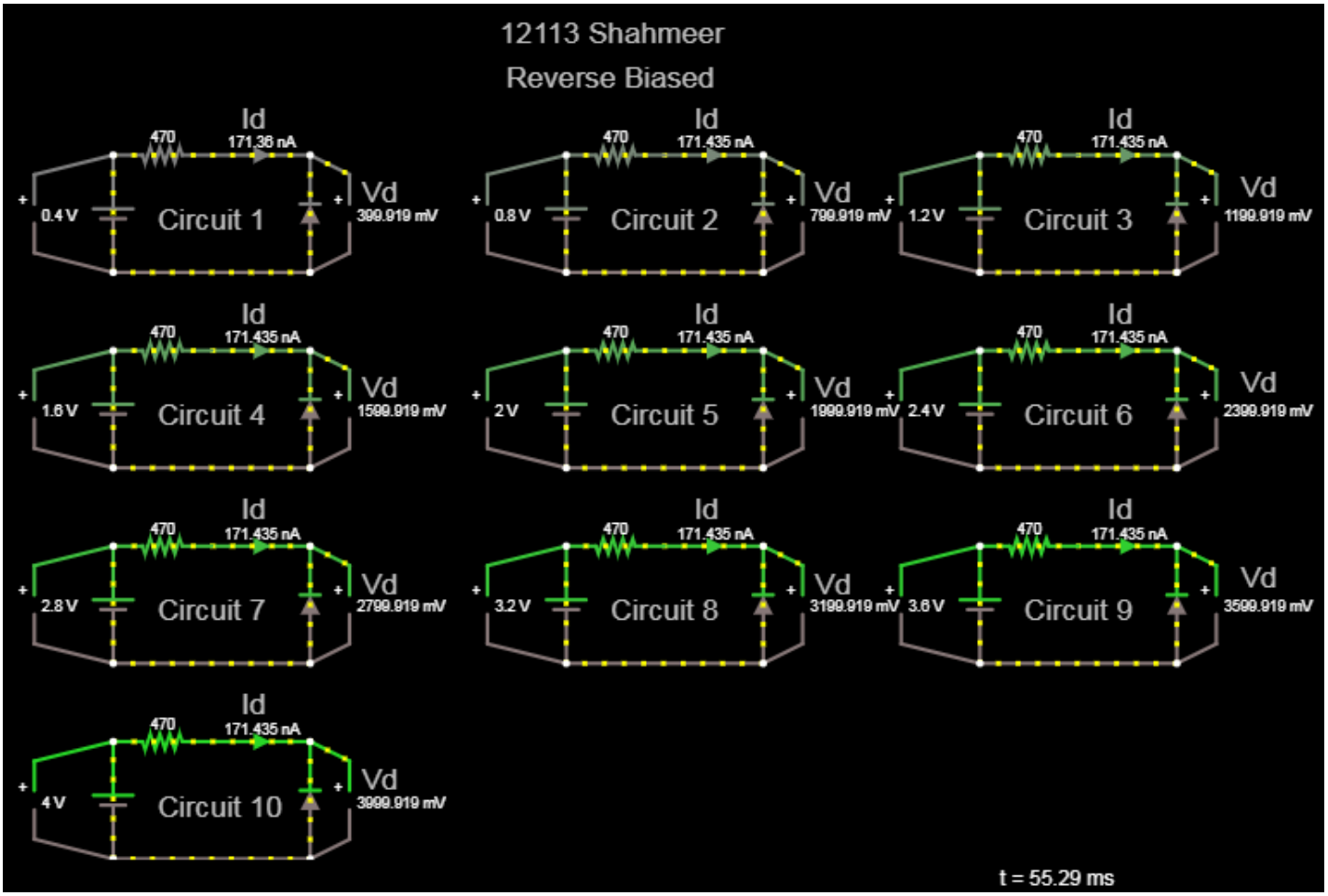

Link:

https://tinyurl.com/yenweqlz