BE LAB Task # 11

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Topic: Introduction to Transistor.

Objectives:

A) IDENTIFICATION OF TRANSISTOR TYPE (NPN, PNP) AND TERMINALS (COLLECTOR, BASE, EMITTER) OF A684 AND C945.

B) DEMONSTRATE AND MEASURE THE EFFECTS OF BASE ON COLLECTOR CURRENT OF FORWARD AND REVERSE BIAS IN THE EMITTER-BASE CIRCUIT.

C) DEMONSTRATE AND MEASURE THE EFFECTS OF BASE ON COLLECTOR CURRENT OF FORWARD AND REVERSE BIAS IN THE EMITTER-BASE CIRCUIT.

D) DEMONSTRATE AND MEASURE THE EFFECTS OF BASE ON COLLECTOR CURRENT OF A CHANGE IN COLLECTOR VOLTAGE.

Objectives A:

IDENTIFICATION OF TRANSISTOR TYPE (NPN, PNP) AND TERMINALS (COLLECTOR, BASE, EMITTER) OF A684 AND C945.

TERMINALS	**A684**(PNP)	**C945**(NPN)
LEFT LEAD	Emitter	Emitter
MIDDLE LEAD	Collector	Base
RIGHT LEAD	Base	Collector

Objectives B:

DEMONSTRATE AND MEASURE THE EFFECTS OF BASE ON COLLECTOR CURRENT OF FORWARD AND REVERSE BIAS IN THE EMITTER-BASE CIRCUIT.

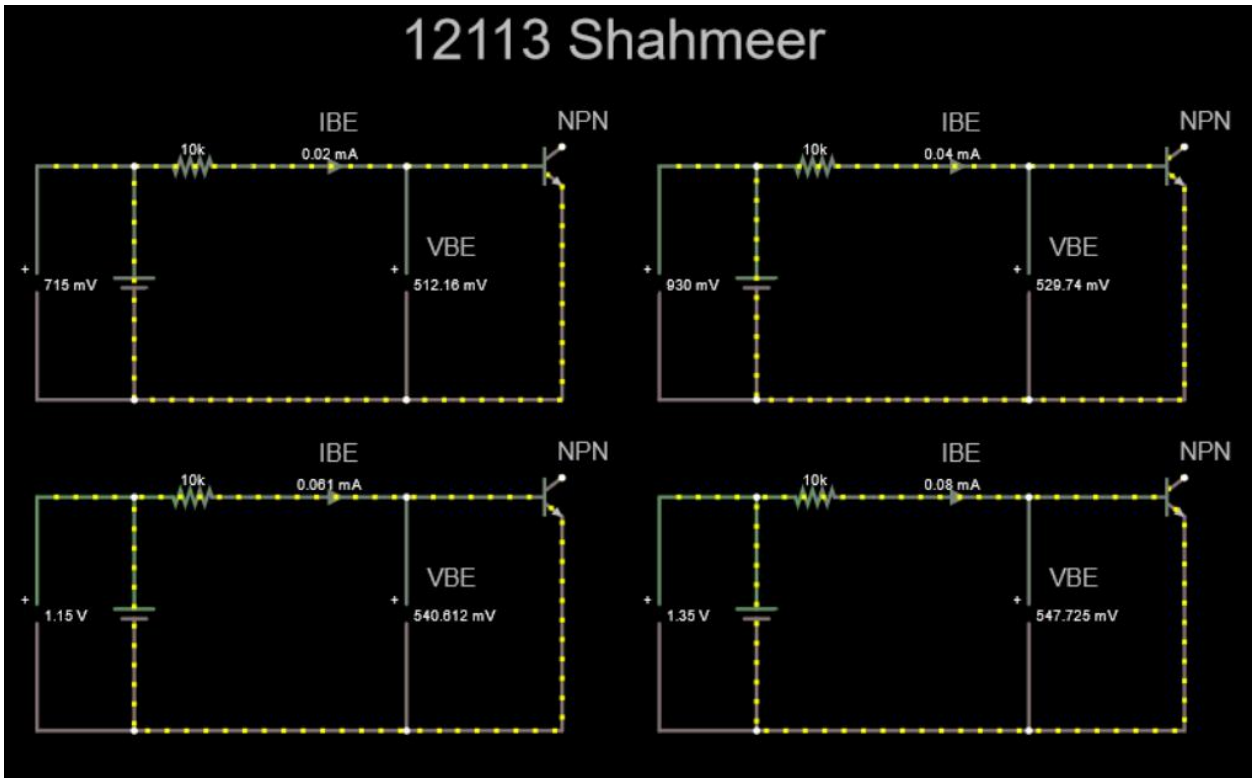
BY USING NPN TRANSISTOR

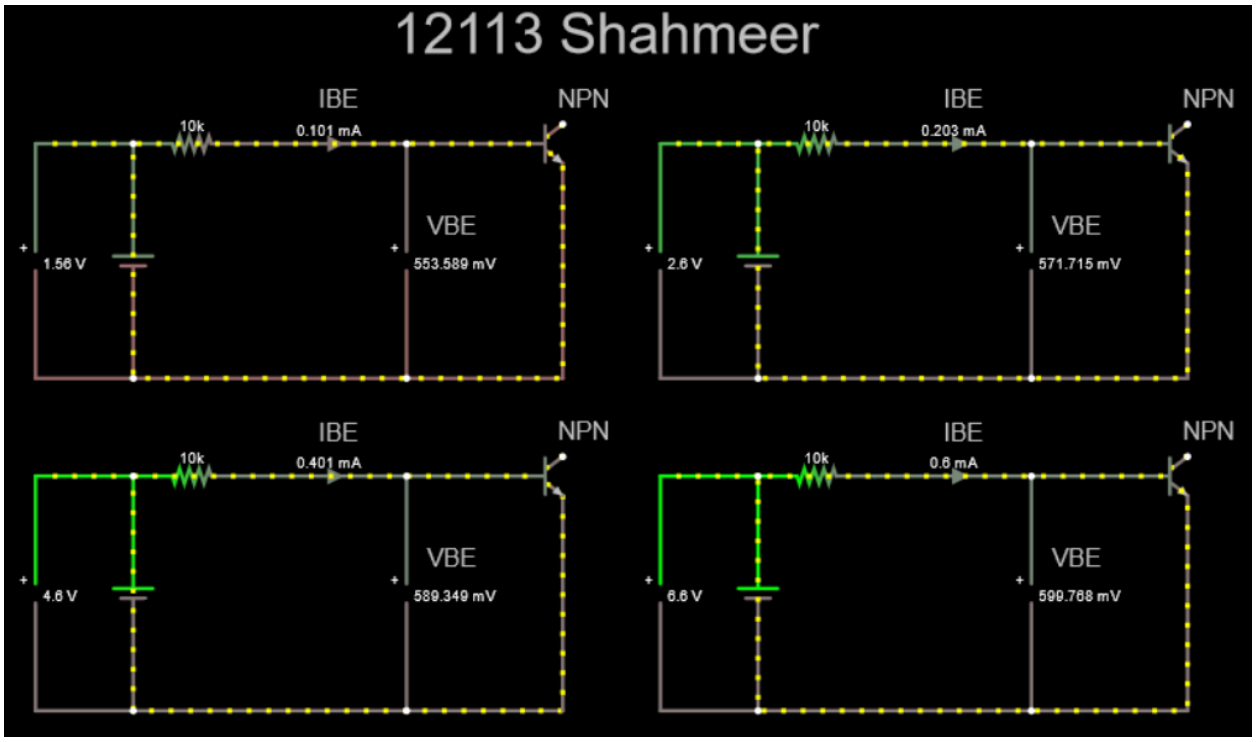
I_B	V_{BE}			V_{BE}	
mA	Q1	Q2		Q1	Q2
0.02	**512.16**		0.4	**589.349**	
0.04	**529.74**		0.6	**599.768**	
0.06	**540.612**		0.8	**607.346**	
0.08	**547.725**		1.0	**613.075**	
0.1	**553.589**		2.0	**630.933**	
0.2	**571.715**		3.0	**641.403**	

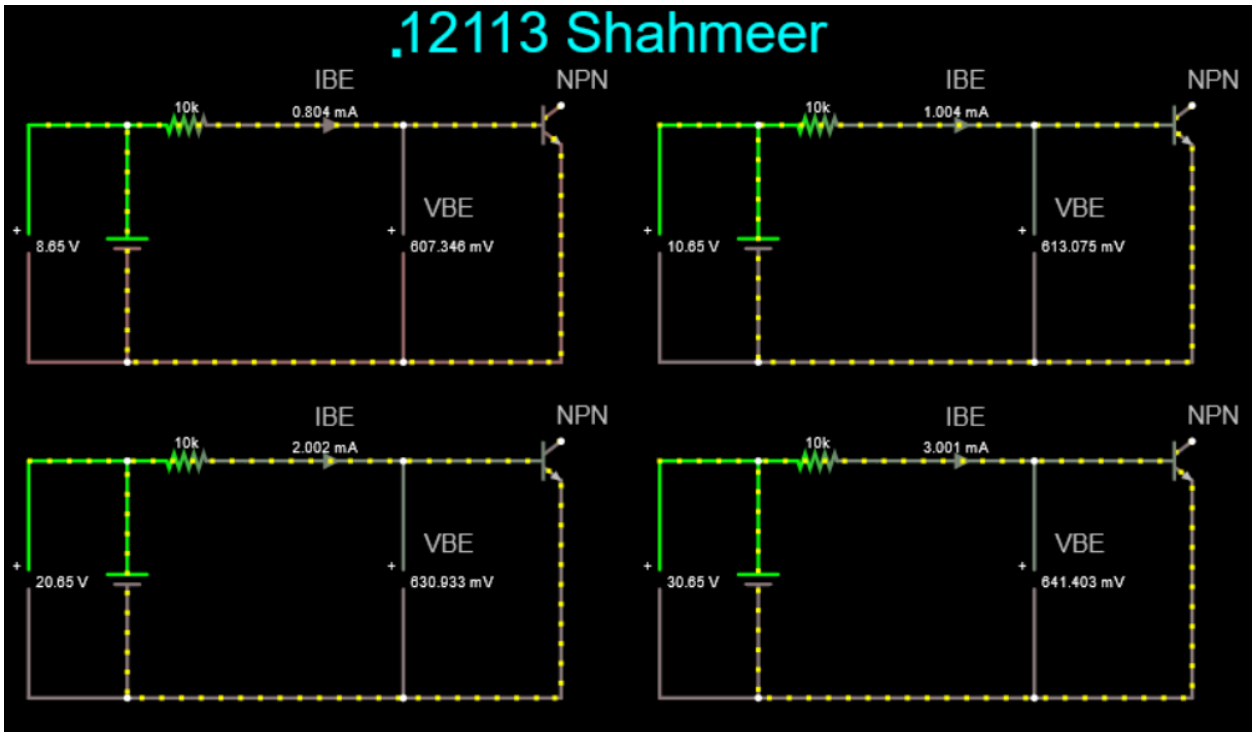
BY USING THE FOLLOWING VALUES FOR VOLTAGE AND SETTING RESISTANCE AT 10K Ω.

INPUT SOURCE VOLT	BASE CURRENT (IB)
715 mV	0.02 mA
930 mV	0.04 mA
1.15 V	0.06 mA
1.35 V	0.08 mA
1.56 V	0.1 mA
2.6 V	0.2 mA
4.6 V	0.4 mA
6.6 V	0.6 mA
8.65 V	0.8 mA
10.65 V	1 mA
20.65 V	2 mA
30.65 V	3 mA

- ***Screen-Shots:***







- ***Link:***

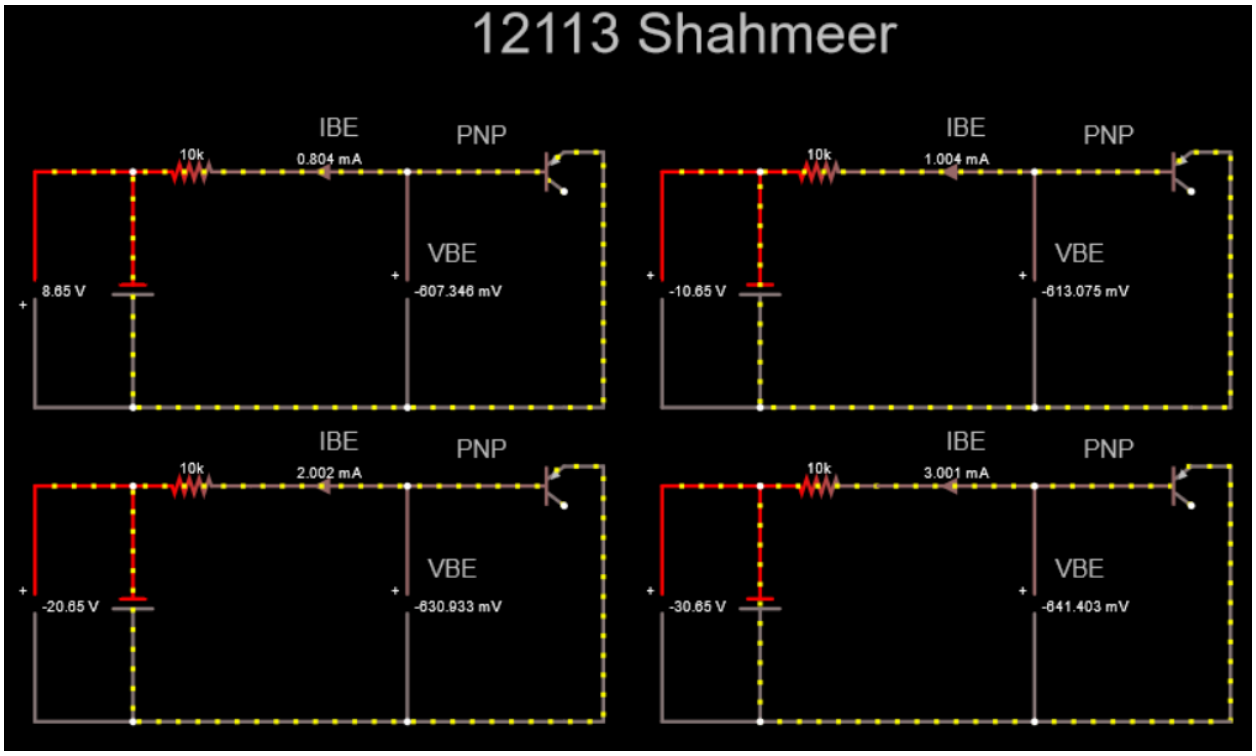
  https://tinyurl.com/ygr48xg5

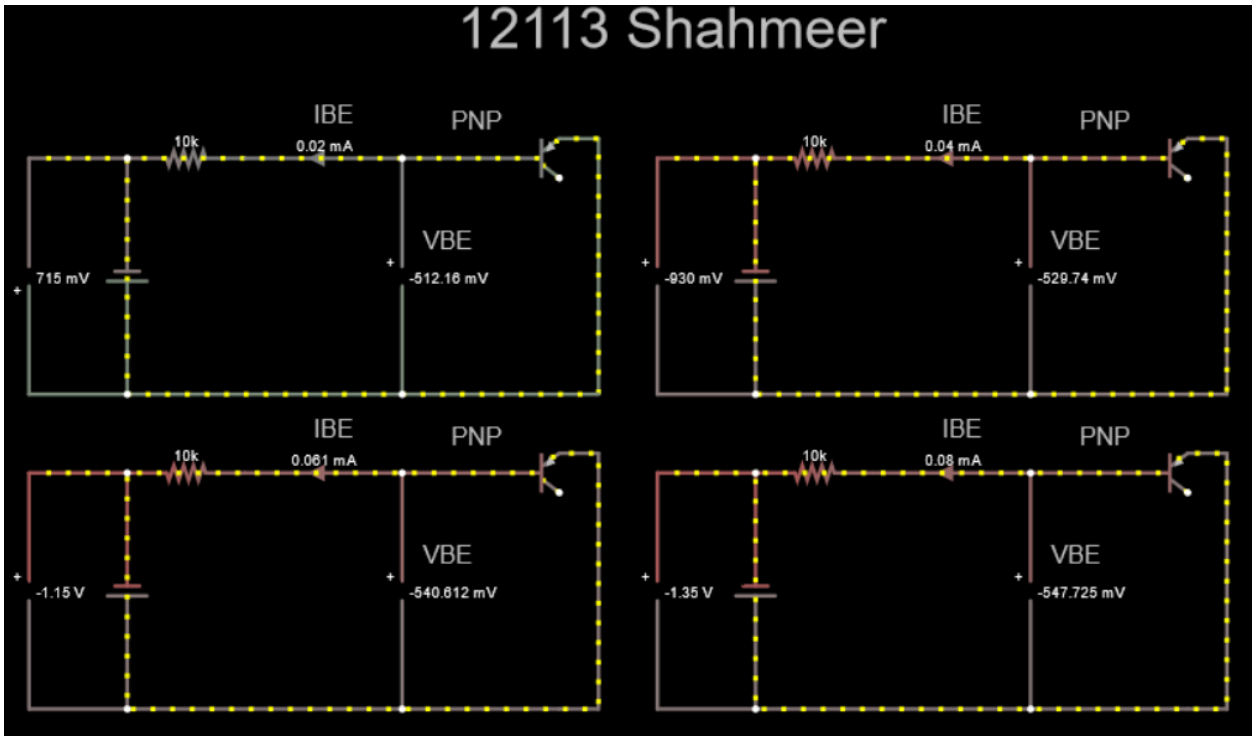
- REPEATING THE SAME PROCESS WITH PNP TRANSISTORS:

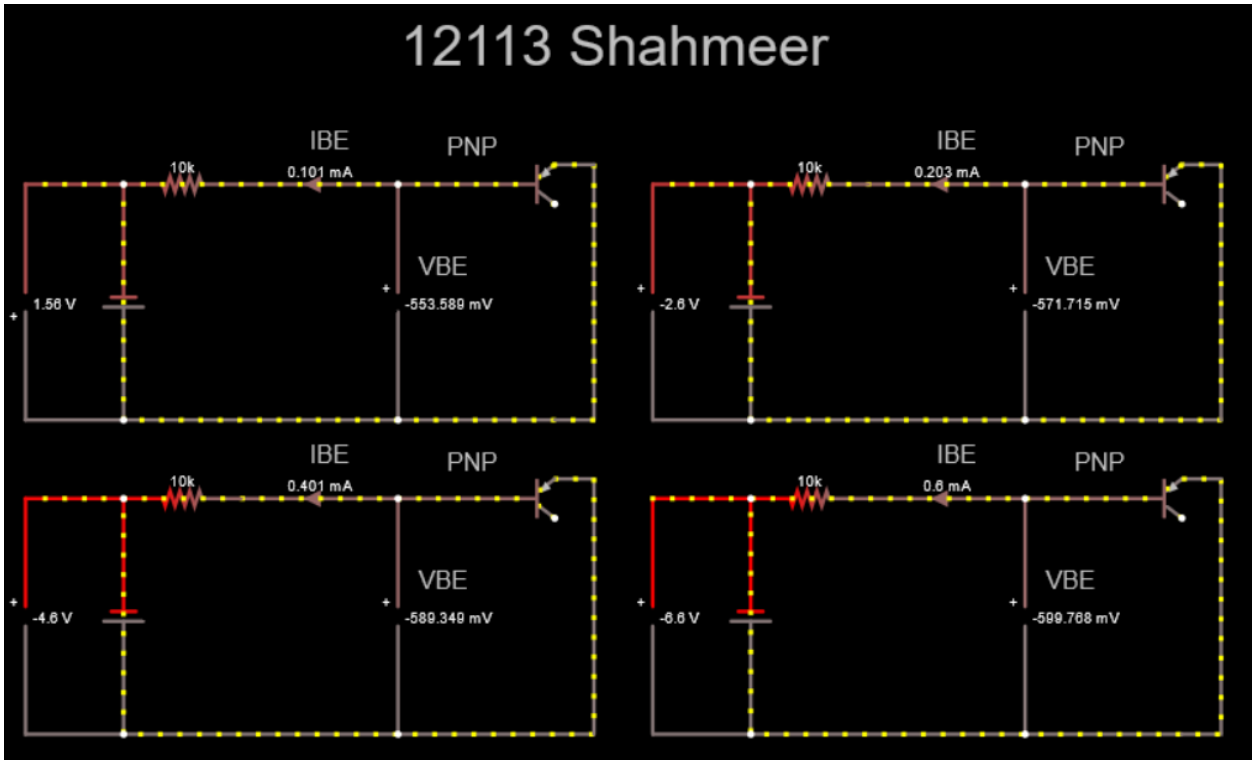
BY USING PNP TRANSISTOR:

I_B mA	V_{BE}			V_{BE}	
	Q1	Q2		Q1	Q2
0.02		**512.16**	0.4		**589.349**
0.04		**529.74**	0.6		**599.768**
0.06		**540.612**	0.8		**607.346**
0.08		**547.725**	1.0		**613.075**
0.1		**553.589**	2.0		**630.933**
0.2		**571.715**	3.0		**641.403**

- ***<u>Screen-Shots:</u>***







- ***Link:***

https://tinyurl.com/yehfesmu

*) IEBO = - 1.581micro A dc.

*) EXAMINE YOUR RECORDED DATA IN TABLE 1, IS THERE ANY SIMILARITY BETWEEN THE FORWARD VOLTAGE DROP FOR SILICON TRANSISTOR Q1 AND A SILICON DIODE?

*) AT APPROXIMATELY WHAT VOLTAGE IS THE BASE TO EMITTER OF Q1 COMPLETELY OF FORWARD BIASED?

VBE (SILICON) = 0.7 Vdc.

*) AT APPROXIMATELY WHAT VOLTAGE IS THE BASE TO EMITTER OF Q2 COMPLETELY OF FORWARD BIASED?

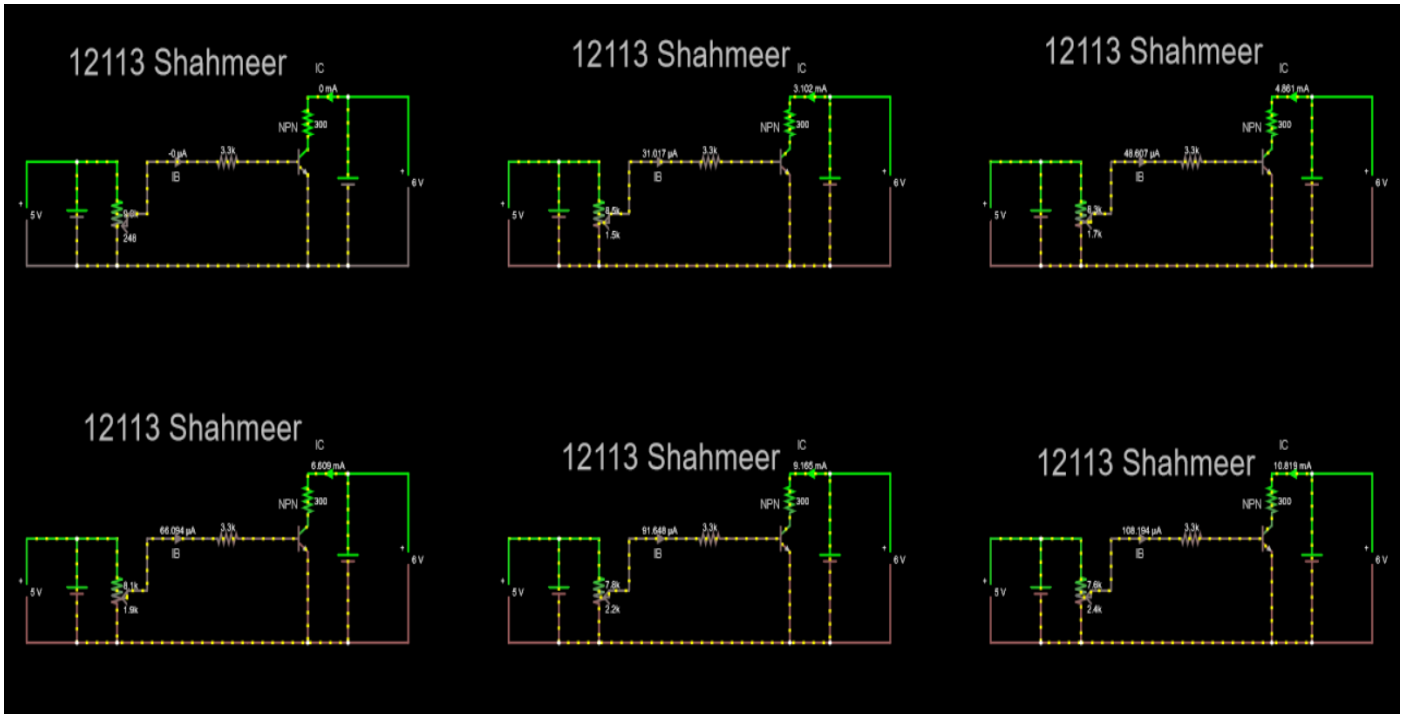
VBE (GERMINIUM) = 0.3Vdc.

Objectives C:

DEMONSTRATE AND MEASURE THE EFFECTS OF BASE ON COLLECTOR CURRENT OF FORWARD AND REVERSE BIAS IN THE EMITTER-BASE CIRCUIT.

COLLECTOR CURRENT (IC)	BASE CURRENT (IB)
0 m A dc	0 micro Amp
2 m A dc	22.419 m Amp
4 m A dc	39.793 m Amp
6 m A dc	57.386 m Amp
8 m A dc	83.229 m Amp
10 m A dc	99.968 m Amp

- Screen-Shots:



*) EXAMINE THE RESULT SHOWN IN DATA 2. DOES A SMALL CHANGE IN BASE CURRENT CAUSE A LARGE CHANGE IN COLLECTOR CURRENT ?

ANS: YES

*) WHAT CHANGE IN BASE CURRENT IS REQUIRED TO CHANGE THE COLLECTOR CURRENT FROM 2mAdc to 10mAdc ? THE GREEK LETTER DELTA MEANS “CHANGE IN”.

Solution:

Since, (DELTA) IB = IB (AT IC = 10 mA) - IB (AT IC = 2 mA)

HERE,

IB (AT IC = 10 m A)= 99.968 m Amp

IB (AT IC = 2 m A) = 22.419 m Amp

SO,

(DELTA) IB = 99.968-22.419

(DELTA) IB = 77.549 m A dc.

- ***Link:***

https://tinyurl.com/yhpjqyum