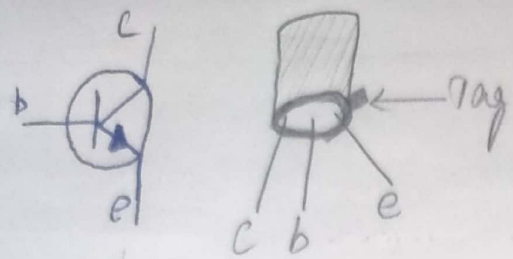
PIN DIAGRAM:

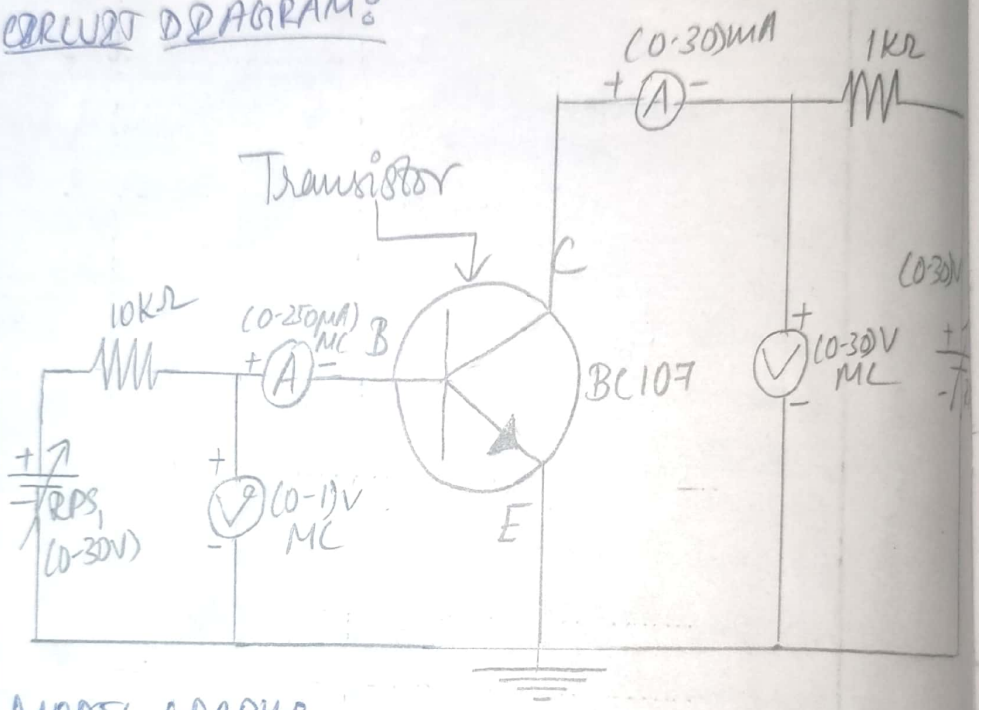


e - emitter
b - base
c - collector

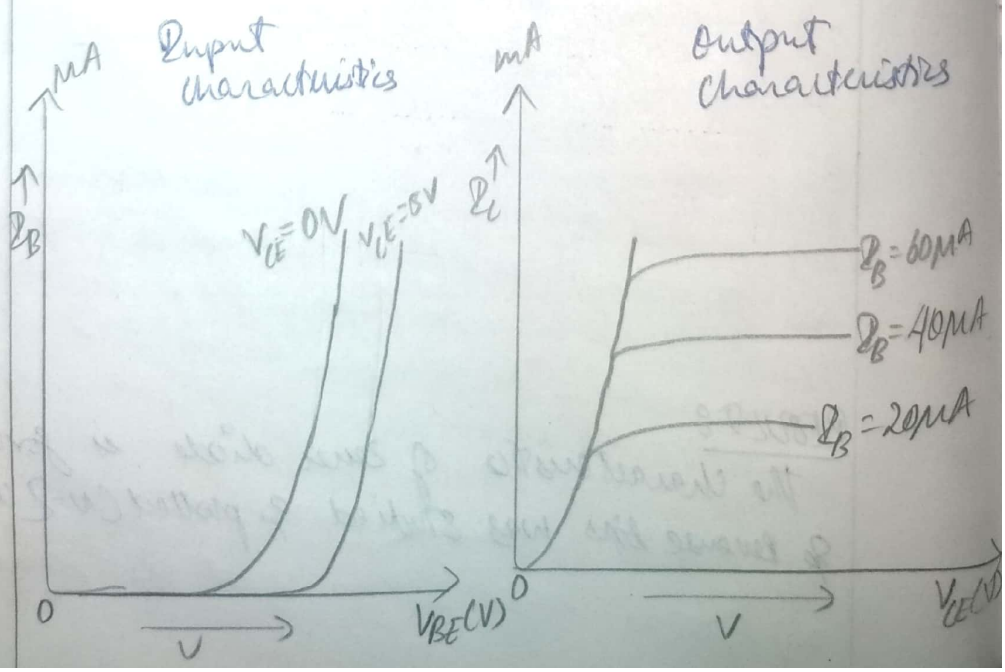
2N2222
BC107, BC108, BC109

Specification: BC107/50V/0.1A, 0.3W, 300MHz

CIRCUIT DIAGRAM:



MODEL GRAPH:



Expt 07

CHARACTERISTICS OF BJT (CE CONFIGURATION)

AIM:

To plot the transistor (BJT) characteristics of CE configuration.

APPARATUS REQUIRED:

S.No	Name	Range	Qty
01)	RPS	(0-30) V	2
02)	Ammeter	(0-30) mA MC	1
		(0-250) MA MC	1
03)	Voltmeter	(0-30) V MC	1
		(0-1) V MC	1

COMPONENTS REQUIRED:

S.No	Name	Range	Qty
01)	Transistor	BC 107	1
02)	Resistor	100kΩ	1
	Resistor	1kΩ	1
03)	Bread Board	-	1
04)	Wires	-	Required

THEORY:

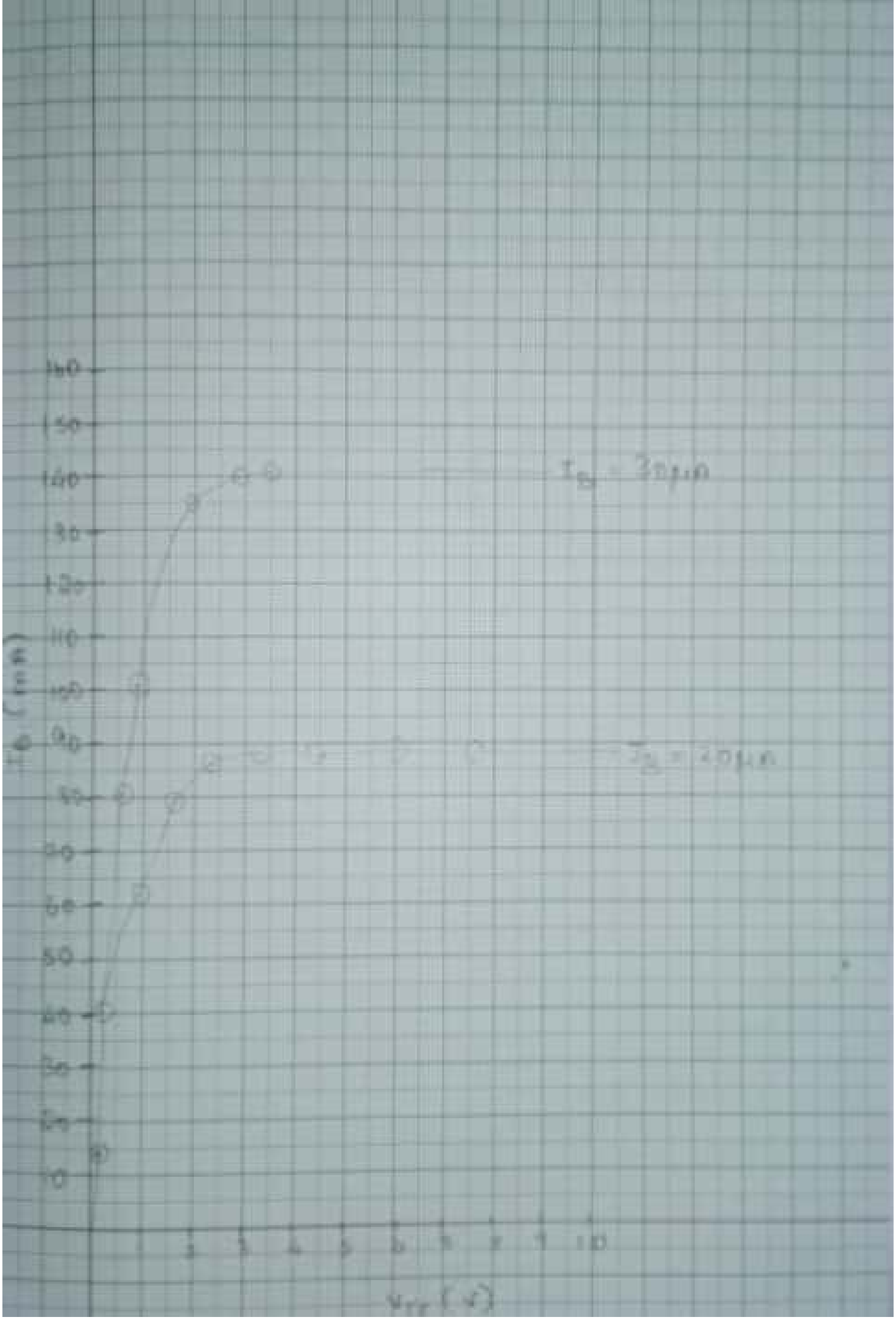
A BJT is a three terminal two - junction semiconductor device in which the condition is due to both the charge carrier. Hence it is a bipolar device. BJT is classified into two type - NPN & PNP.

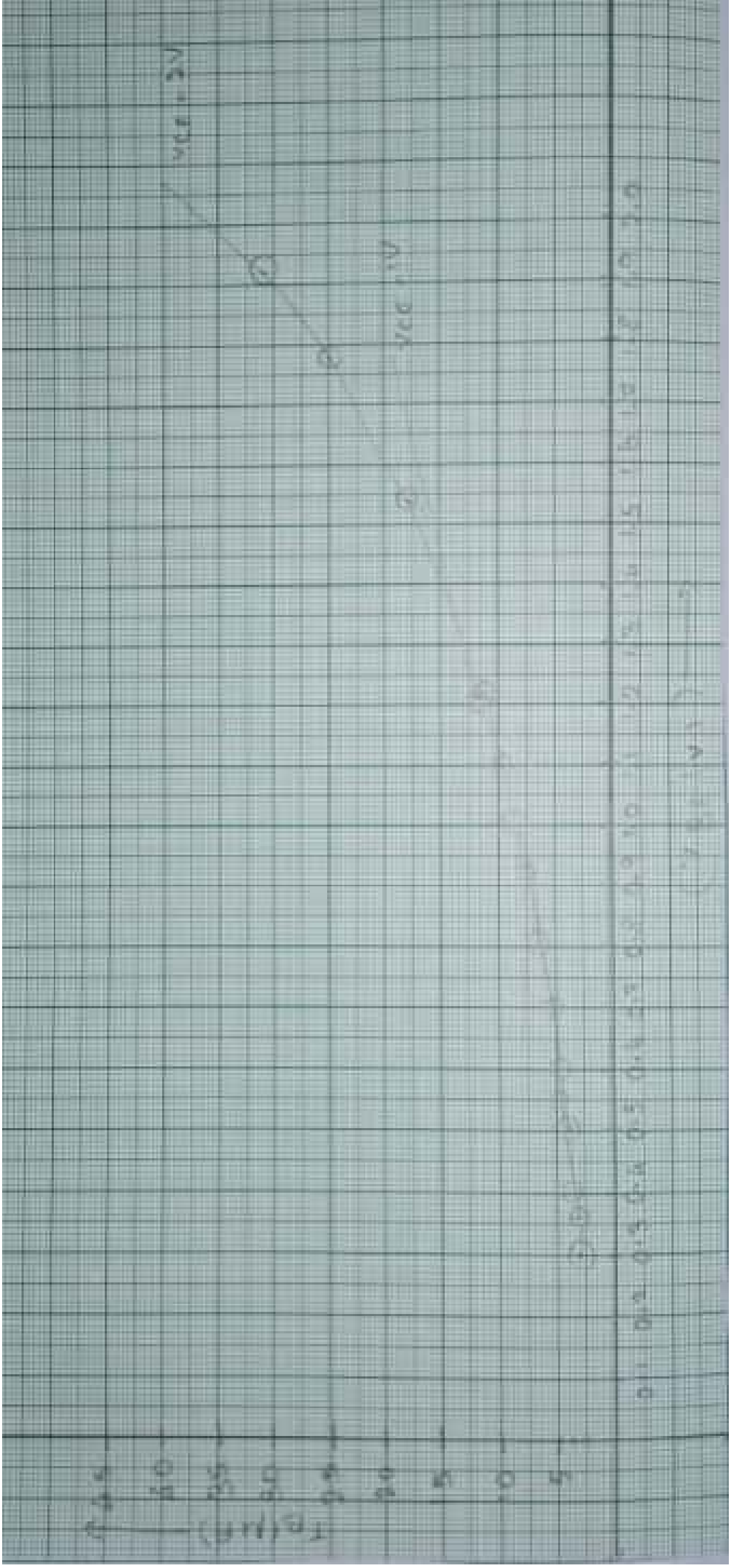
INPUT CHARACTERISTICS:

V_{CE} = 1V		V_{CE} = 2V	
V_{BE} (V)	I_B (μA)	V_{BE} (V)	I_B (μA)
0.3000	3.070	0.3600	3.345
0.4000	3.542	0.6400	4.990
0.5000	4.085	0.9200	7.440
0.6000	4.713	1.220	11.430
0.7000	5.437	1.540	18.050
0.8200	6.453	1.780	25.430
1.000	8.345	1.920	37.06
1.100	9.627		
1.200	11.11		

OUTPUT CHARACTERISTICS:

I_B = 20μA		I_B = 30μA	
V_{CE} (V)	I_B (mA)	V_{CE} (V)	I_B (mA)
0.9000	63.360	0.1000	14.13
1.5000	80.060	0.3000	41.29
2.8000	86.690	0.6000	76.11
3.3000	88.210	0.9000	101.5
4.4000	88.420	1.9000	135.5
6.0000	88.450	2.9000	140.9
7.6000	88.450	3.5000	141.5





A NPN transistor consists of two N types in between which a layer of P is sandwiched. the transistor consists of three terminal emitter, collector, base. the emitter layer is the source of the charge carriers & it is heavily doped with a moderate cross sectional area. the collector collects the charge carriers & hence moderate doping & large cross sectional area. the base region acts a path for the movement of the charge carriers. In order to reduce the recombination of holes & electrons the base region is lightly doped & is of hollow cross sectional area. Normally the transistor operates with EB junction forward bias.

PROCEDURE:

INPUT CHARACTERISTICS

01) connect the circuit as per the circuit diagram.
02) set V_{CE}, vary V_{BE} in regular interval of steps & note down the corresponding I_B reading. Repeat the above procedure for different values of V_{CE}
03) Plot the graph: V_{BE}, V_S, I_B for a constant V_{CE}.

OUTPUT CHARACTERISTICS:

01) connect the circuit as per circuit diagram.
02) set I_B, vary V_{CE} in regular interval of steps & note down the corresponding I_C reading. Repeat the above procedure for different value of I_B.
03) Plot the graph: V_{CE}, V_S, I_C for a constant I_B.

RESULT:

Hence, the transistor (BJT) characteristics of CE configuration is plotted.