MP 309 Virtual Experimant 2

BJT Common Emitter Characteristics

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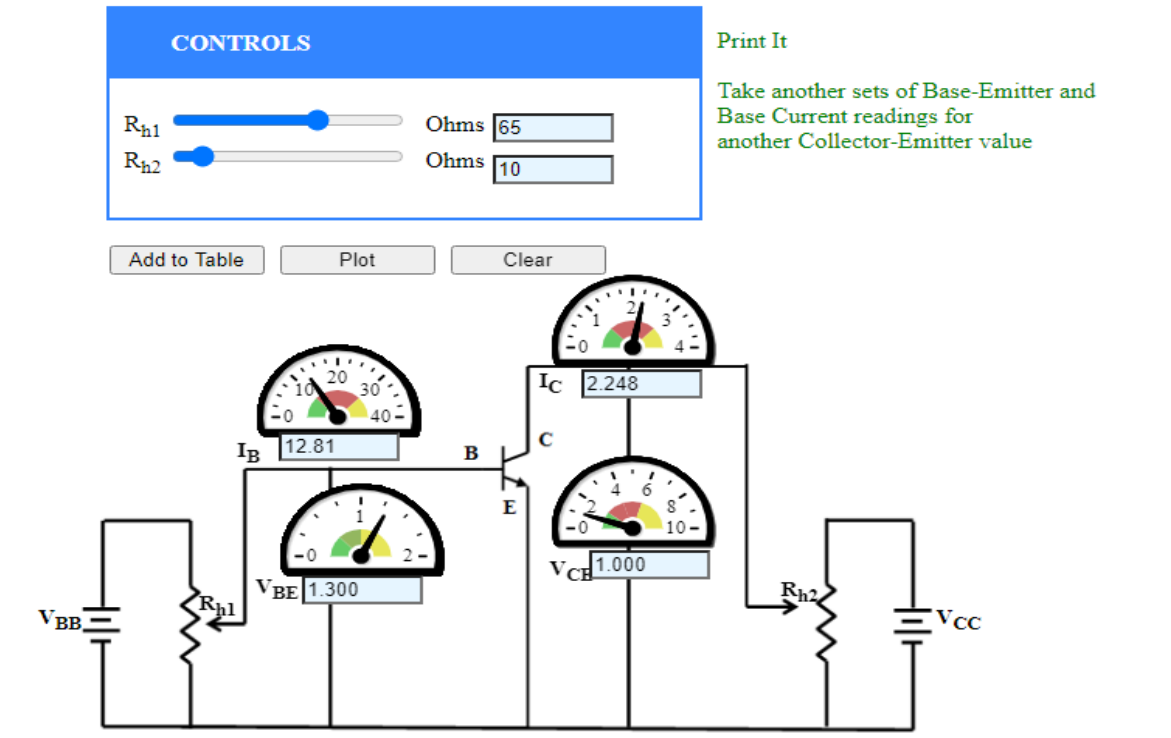
Semester:- 5 **3rd year MSc Physics**

Part 1 BJT- CE INPUT CHARACTERISTICS

Circuit Diagram:-

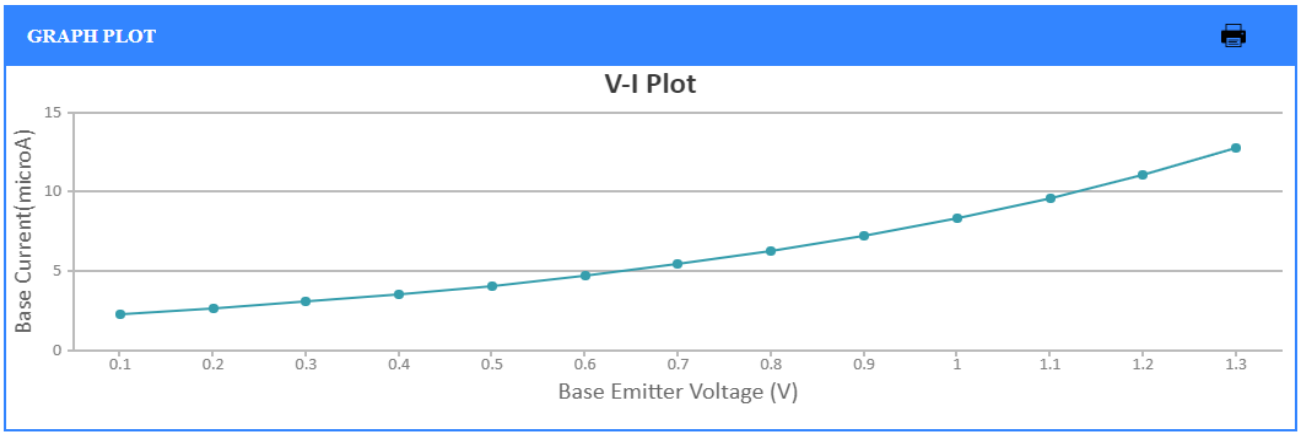


Observation Table :- For V_{CE} = 1V

EXPERIMENTAL TABLE

Serial No.	Collector-Emitter Voltage 1.000 V	
	Base-Emitter Voltage V	Base Current(μA)
1	0.1000	2.307
2	0.2000	2.661
3	0.3000	3.070
4	0.4000	3.542
5	0.5000	4.085
6	0.6000	4.713
7	0.7000	5.437
8	0.8000	6.271
9	0.9000	7.235
10	1.000	8.345
11	1.100	9.627
12	1.200	11.11
13	1.300	12.81

Graph (V-I):- V_{CE} = 1V

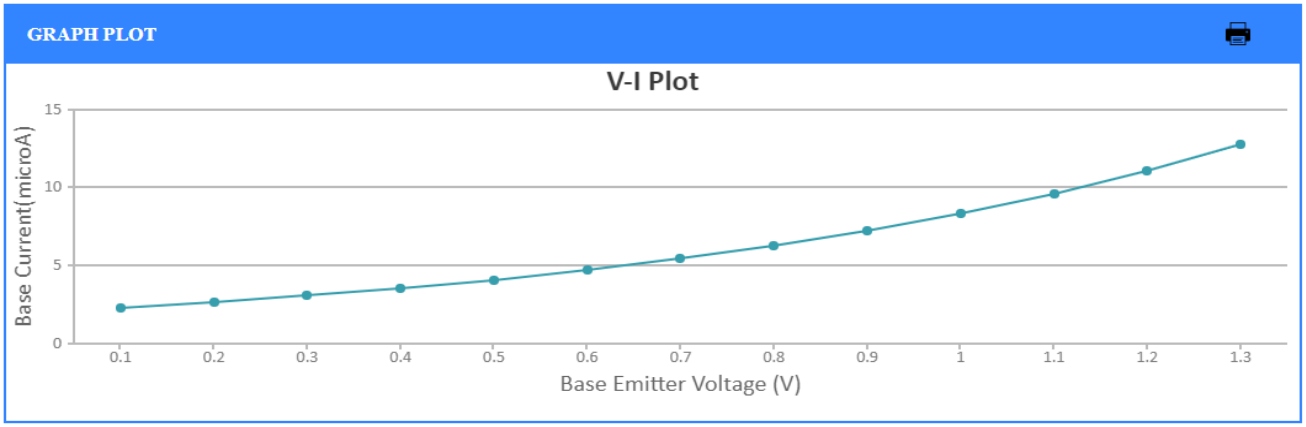


Observation Table :- For V_{CE} = 2V

EXPERIMENTAL TABLE

Serial No.	Collector-Emitter Voltage 2.000 V	
	Base-Emitter Voltage V	Base Current(μA)
1	0.1000	2.307
2	0.2000	2.661
3	0.3000	3.070
4	0.4000	3.542
5	0.5000	4.085
6	0.6000	4.713
7	0.7000	5.437
8	0.8000	6.271
9	0.9000	7.235
10	1.000	8.345
11	1.100	9.627
12	1.200	11.11
13	1.300	12.81

Graph (V-I):- V_{CE} = 2V

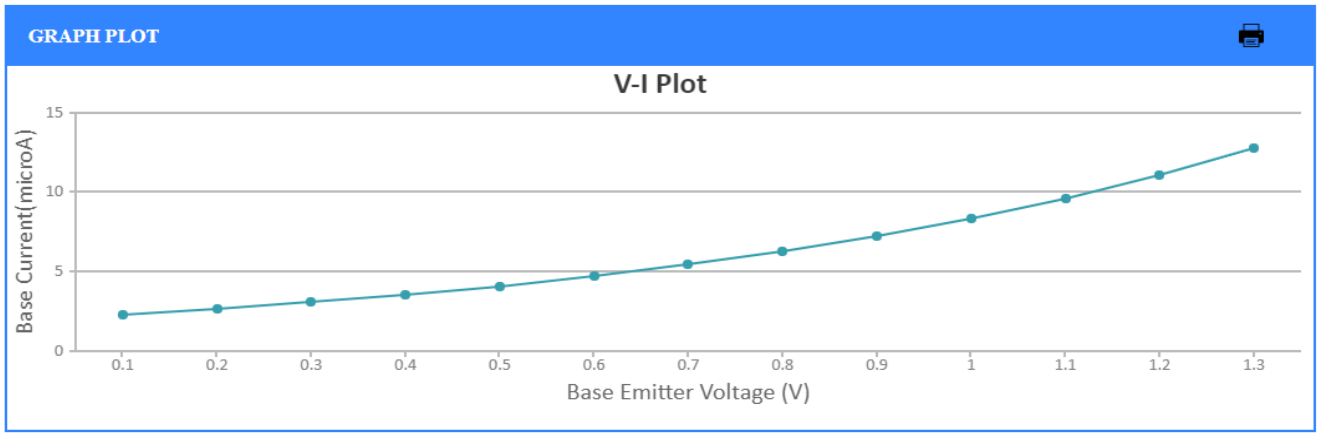


Observation Table :- For V_{CE} = 3V

EXPERIMENTAL TABLE

Serial No.	Collector-Emitter Voltage 3.000 V	
	Base-Emitter Voltage V	Base Current(μA)
1	0.1000	2.307
2	0.2000	2.661
3	0.3000	3.070
4	0.4000	3.542
5	0.5000	4.085
6	0.6000	4.713
7	0.7000	5.437
8	0.8000	6.271
9	0.9000	7.235
10	1.000	8.345
11	1.100	9.627
12	1.200	11.11
13	1.300	12.81

Graph (V-I):- V_{CE} = 3V

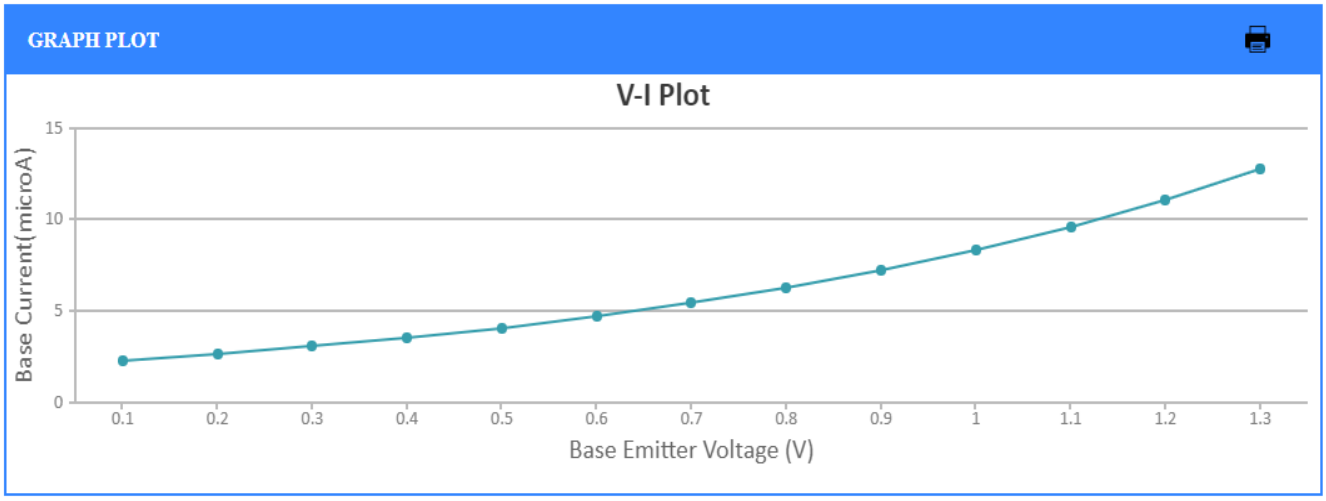


Observation Table :- For V_{CE} = 4V

EXPERIMENTAL TABLE

Serial No.	Collector-Emitter Voltage 4.000 V	
	Base-Emitter Voltage V	Base Current(μA)
1	0.1000	2.307
2	0.2000	2.661
3	0.3000	3.070
4	0.4000	3.542
5	0.5000	4.085
6	0.6000	4.713
7	0.7000	5.437
8	0.8000	6.271
9	0.9000	7.235
10	1.000	8.345
11	1.100	9.627
12	1.200	11.11
13	1.300	12.81

Graph (V-I):- V_{CE} = 4V

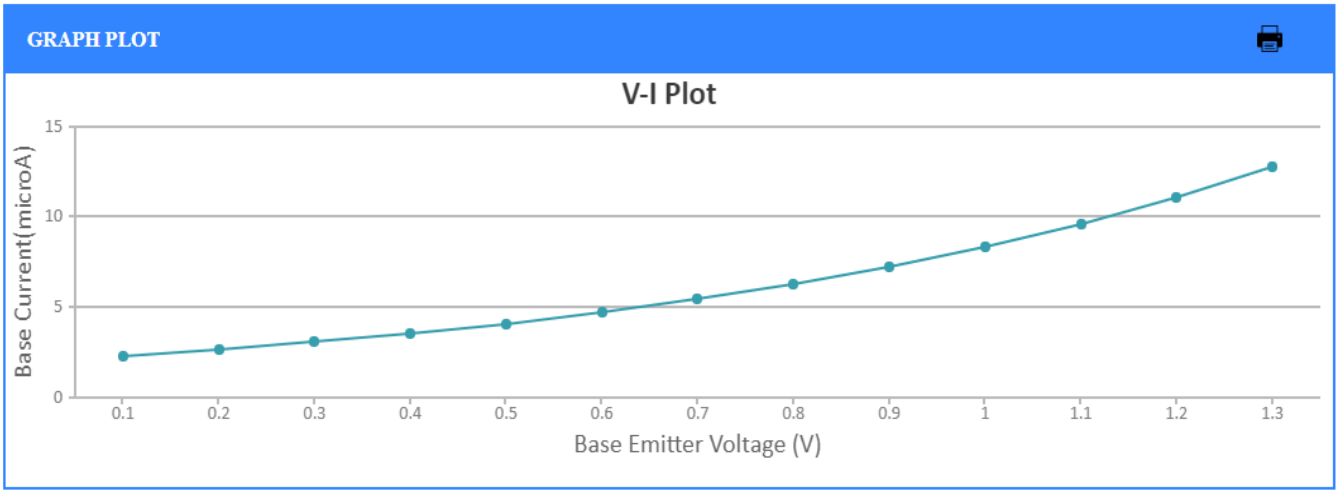


Observation Table :- For V_{CE} = 5V

EXPERIMENTAL TABLE

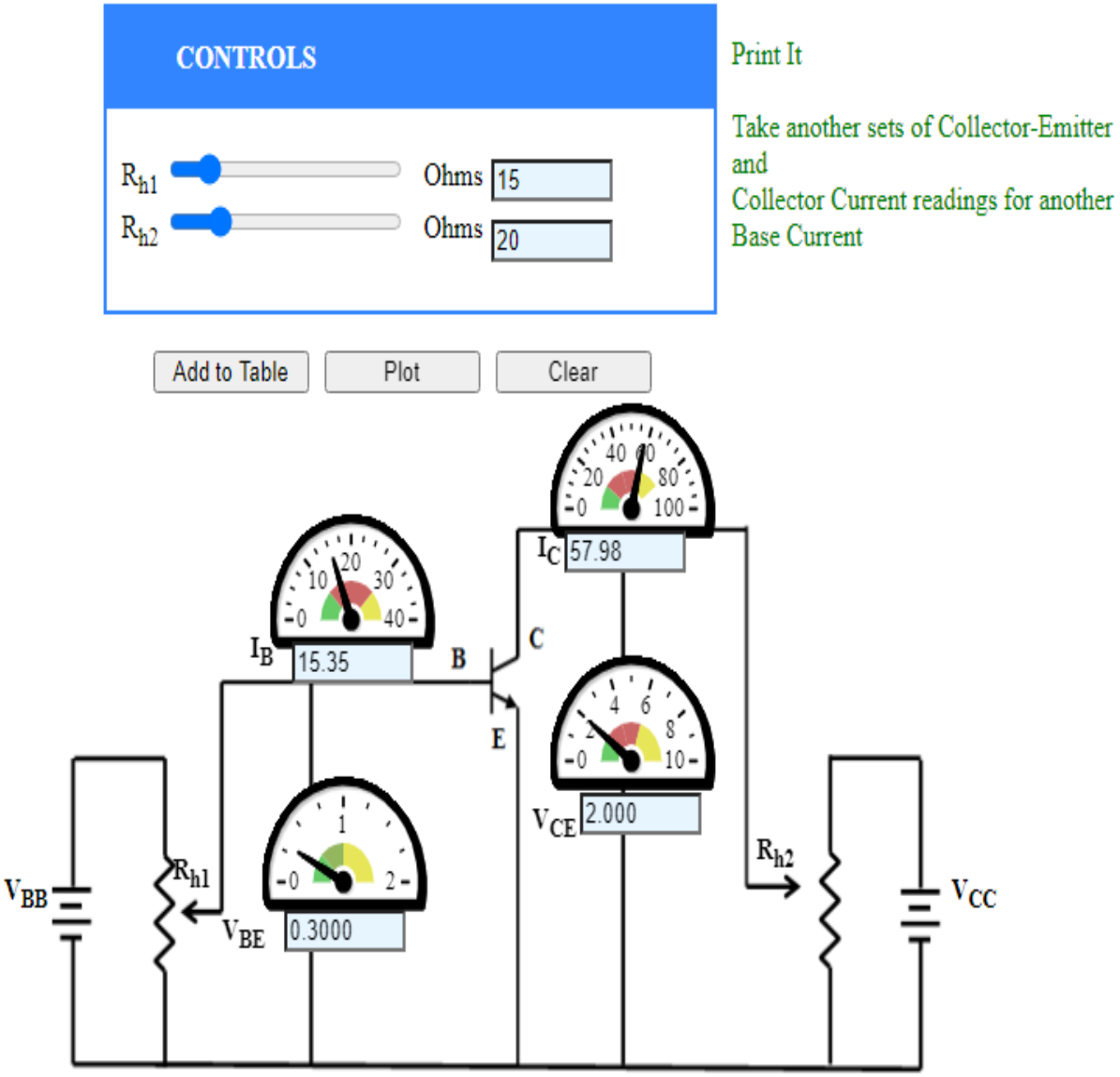
Serial No.	Collector-Emitter Voltage 5.000 V	
	Base-Emitter Voltage V	Base Current(μA)
1	0.1000	2.307
2	0.2000	2.661
3	0.3000	3.070
4	0.4000	3.542
5	0.5000	4.085
6	0.6000	4.713
7	0.7000	5.437
8	0.8000	6.271
9	0.9000	7.235
10	1.000	8.345
11	1.100	9.627
12	1.200	11.11
13	1.300	12.81

Graph (V-I):- V_{CE} = 5V



Part 2 BJT- CE OUTPUT CHARACTERISTICS

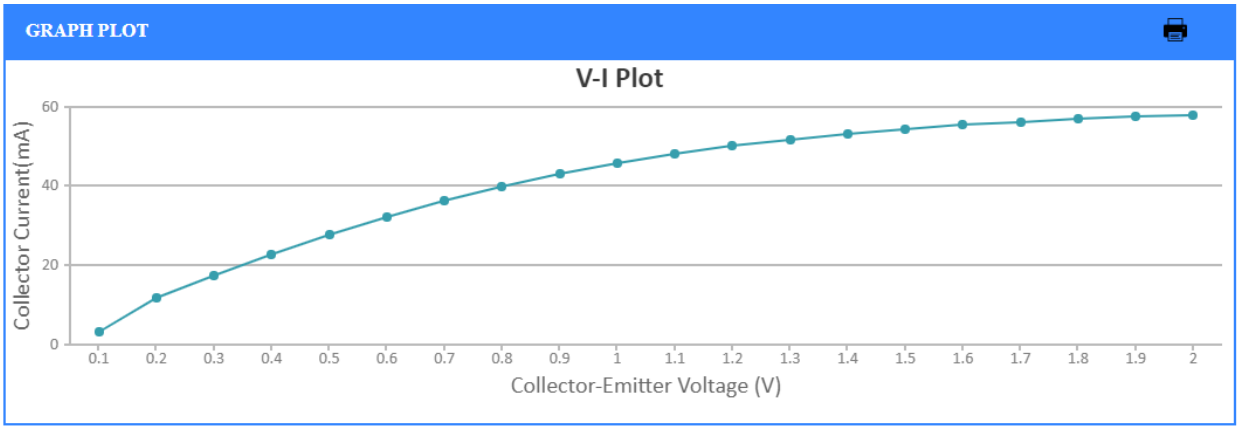
Circuit Diagram :-



Observation Table:- (I_B=15.35 µA)

EXPERIMENTAL TABLE		
Serial No.	Base-Current 15.35 µA	
	Collector-Emitter Voltage V	Collector Current mA
1	0.1000	3.290
2	0.2000	11.87
3	0.3000	17.52
4	0.4000	22.85
5	0.5000	27.79
6	0.6000	32.30
7	0.7000	36.35
8	0.8000	39.94
9	0.9000	43.08
10	1.000	45.81
11	1.100	48.14
12	1.200	50.14
13	1.300	51.83
14	1.400	53.25
15	1.500	54.44
16	1.600	55.43
17	1.700	56.26
18	1.800	56.94
19	1.900	57.51
20	2.000	57.98

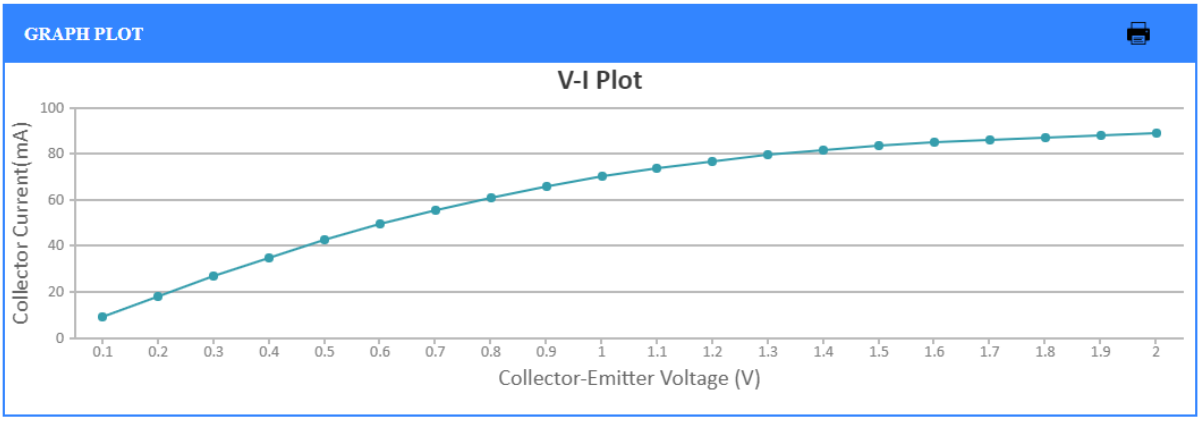
Graph:- (V_{CE}-I_C)


GRAPH PLOT
V-I Plot
Collector Current(mA)
60
40
20
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
Collector-Emitter Voltage (V)

Observation Table:- (I_B=20.43 µA)

EXPERIMENTAL TABLE		
Serial No.	Base-Current 20.43 µA	
	Collector-Emitter Voltage V	Collector Current mA
1	0.1000	9.202
2	0.2000	18.22
3	0.3000	26.90
4	0.4000	35.08
5	0.5000	42.66
6	0.6000	49.58
7	0.7000	55.80
8	0.8000	61.31
9	0.9000	66.13
10	1.000	70.31
11	1.100	73.91
12	1.200	76.97
13	1.300	79.56
14	1.400	81.74
15	1.500	83.57
16	1.600	85.09
17	1.700	86.36
18	1.800	87.41
19	1.900	88.28
20	2.000	89.00

Graph:- (V_{CE}-I_C)


GRAPH PLOT
V-I Plot
Collector Current(mA)
100
80
60
40
20
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
Collector-Emitter Voltage (V)