EEE/ETE111L
Class Assignment 05

Task 01: Complete the tables with required data. --50 points
Task 02: Attach TWO screenshots of the simulated circuits during taking data for table 01 and table 02. --50 points
Task 03: Draw the input and output characteristics of BJT. Label the graph properly by mentioning the name of different regions.

(Drawing can be hand-drawing using pencil & paper or using other smart-tools on PC)

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Task 01:

Table 1: Input Characteristics of BJT

V_{CE} = 1 V				V_{CE} = 5V			
V_{BB} **(Volts)**	V_{BE} **(Volts)**	V_{RB} **(Volts)**	$I_B = V_{RB}/R_B$ **(μA)**	V_{BB} **(Volts)**	V_{BE} **(Volts)**	V_{RB} **(Volts)**	$I_B = V_{RB}/R_B$ **(μA)**
0.1	100mV	0V	0A	0.1	100mV	0V	0A
0.2	200mV	0V	0A	0.2	200mV	0V	0A
0.3	300mV	0V	0A	0.3	300mV	0V	0A
0.5	200mV	24.844mV	0A	0.5	500mV	24.444mV	0A
0.7	677mV	23.168mV	0A	0.7	677mV	23.168mV	0A
1.0	739mV	260.573mV	2.61μA	1.0	739mV	260.573mV	2.61μA
3	795mV	2.205V	22.1μA	3	795mV	2.205V	22.1μA
5	811mV	4.189V	41.9μA	5	811mV	4.189V	41.9μA
7	821mV	6.179V	61.8μA	7	821mV	6.179V	61.8μA
10	832mV	9.168V	91.7μA	10	832mV	9.168V	91.7μA
14	841mV	13.159V	132μA	14	841mV	13.159V	132μA

Here, we're considering 0V and 0A for values that are too small like nV, pA, nA.

Table 2: Output Characteristics of BJT

	I_B = 10 **µA**			I_B = 50 **µA**		
V_{CC} **(Volts)**	V_{CE} **(Volts)**	V_{RC} **(Volts)**	$I_C = V_{RC}/R_{BC}$ **(mA)**	V_{CE} **(Volts)**	V_{RC} **(Volts)**	$I_C = V_{RC}/R_{BC}$ **(mA)**
0.1	51.2mV	48.81mV	48.81A	31.7mV	68.252mV	68.252µA
0.3	87.5mV	212.479mV	212.479µA	51.6mV	248.45mV	248.45µA
0.5	109mV	391.104mV	391.104µA	63.8mV	436.23mV	436.23µA
0.7	128mV	572.499mV	572.499µA	72.7mV	627.274mV	627.274µA
0.9	148mV	751.58mV	751.58µA	80.0mV	820.026mV	820.026µA
1.0	162mV	837.847mV	837.847µA	83.2mV	916.834mV	916.834µA
1.2	219mV	981.124mV	981.124µA	89.0mV	1.111V	1.111mA
1.5	498mV	1.002V	1.002mA	96.6mV	1.403V	1.403mA
2.0	998mV	1.002V	1.002mA	108mV	1.892V	1.892mA
2.5	1.5V	1.002V	1.002mA	118mV	2.382V	2.382mA
3.0	2.0V	1.002V	1.002mA	128mV	2.872V	2.872mA
5.0	4.0V	1.002V	1.002 mA	202mV	4.798V	4.798mA
10.0	9.0V	1.002V	1.002mA	5.0V	4.995V	4.995mA
15.0	14.0V	1.002V	1.002mA	10.0V	4.995V	4.995mA
20.0	19.0V	1.002V	1.002mA	15.0V	4.995V	4.995mA

Task 02:

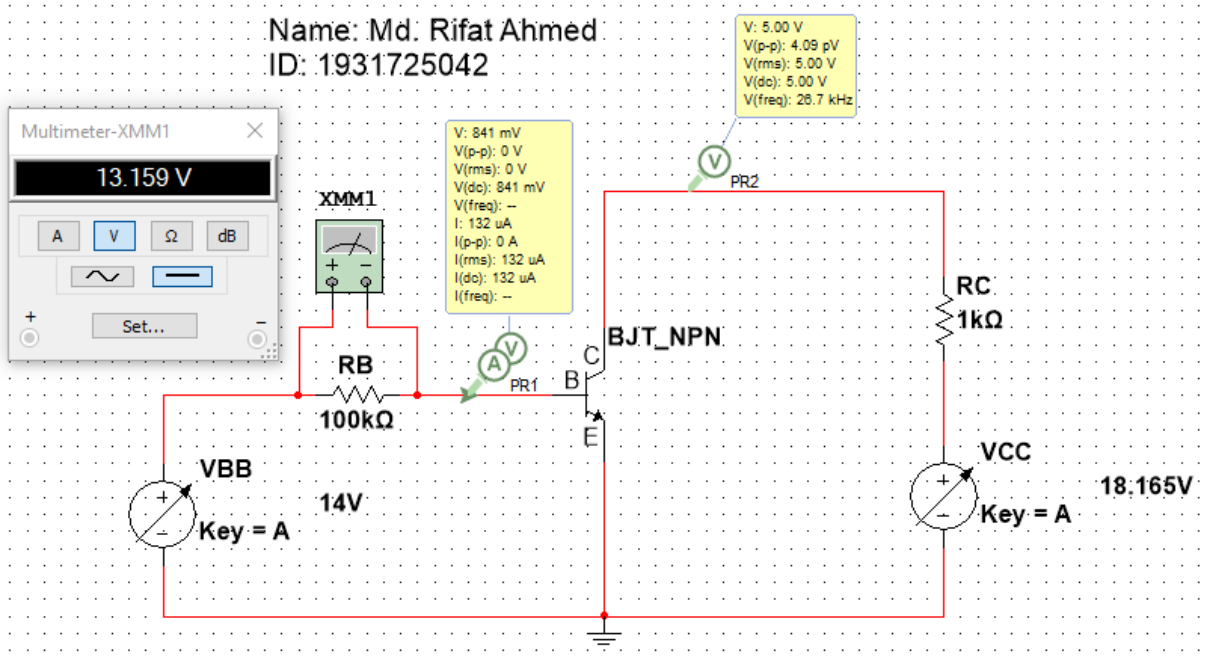

Figure 1 – Circuit to get the values for the Input characteristics of BJT

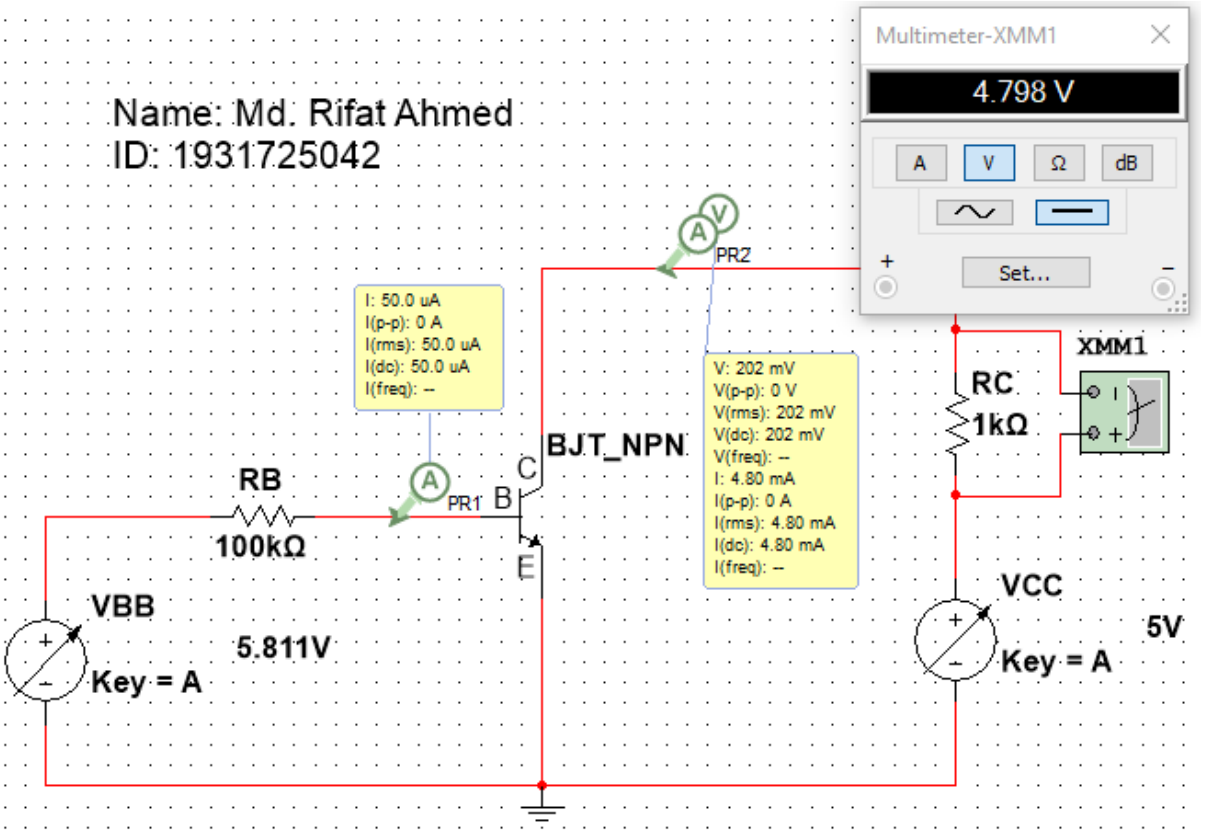

Figure 2 – Circuit to get the values for the Output characteristics of BJT

Task 03:

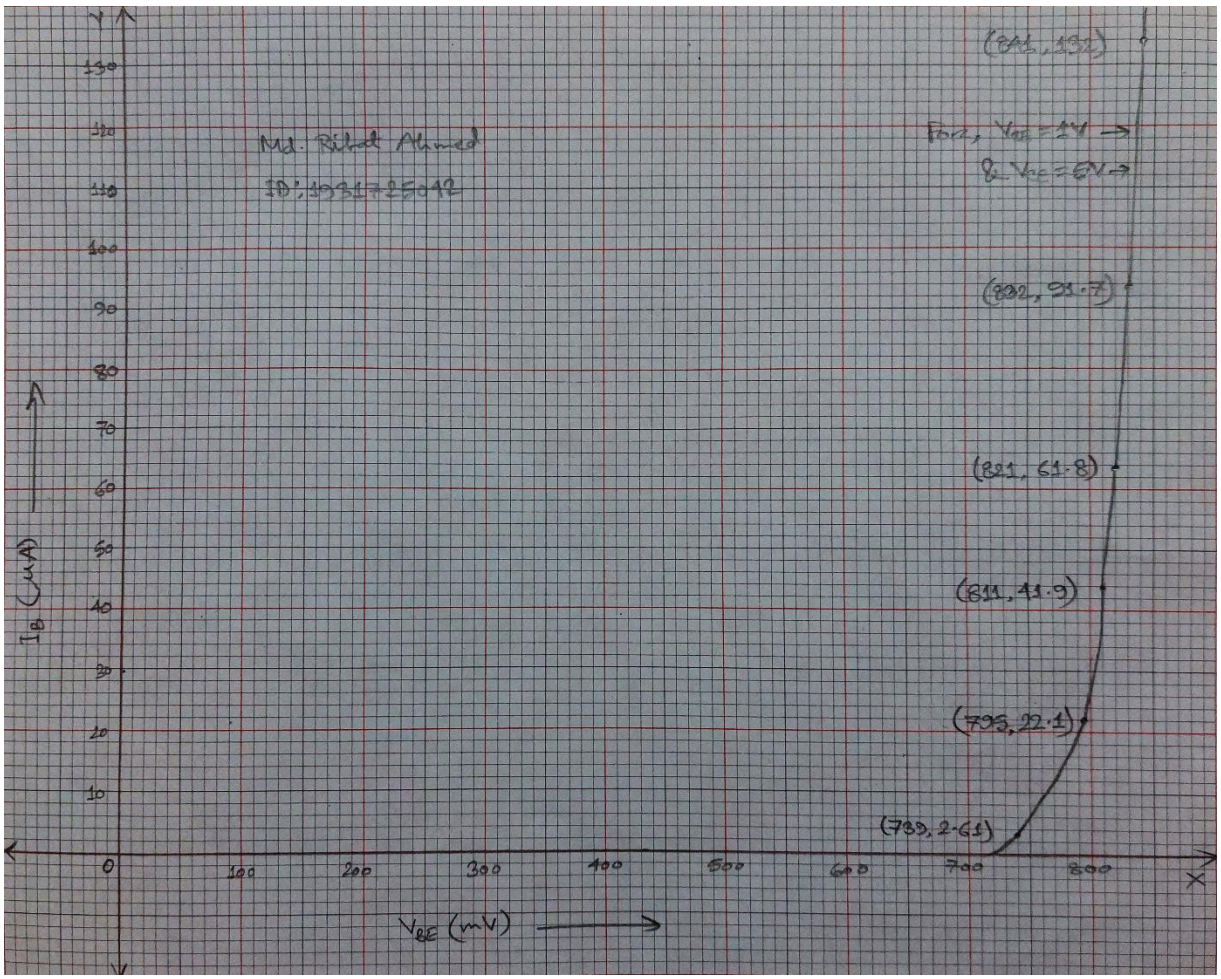

Figure 3 – Input Characteristics Graph of BJT for V_{CE} = 1V & 5V

Here, we got the same values of I_B and V_{BE} for the given points for both V_{CE} = 1V & 5V while simulating so the same line is representating both of them.

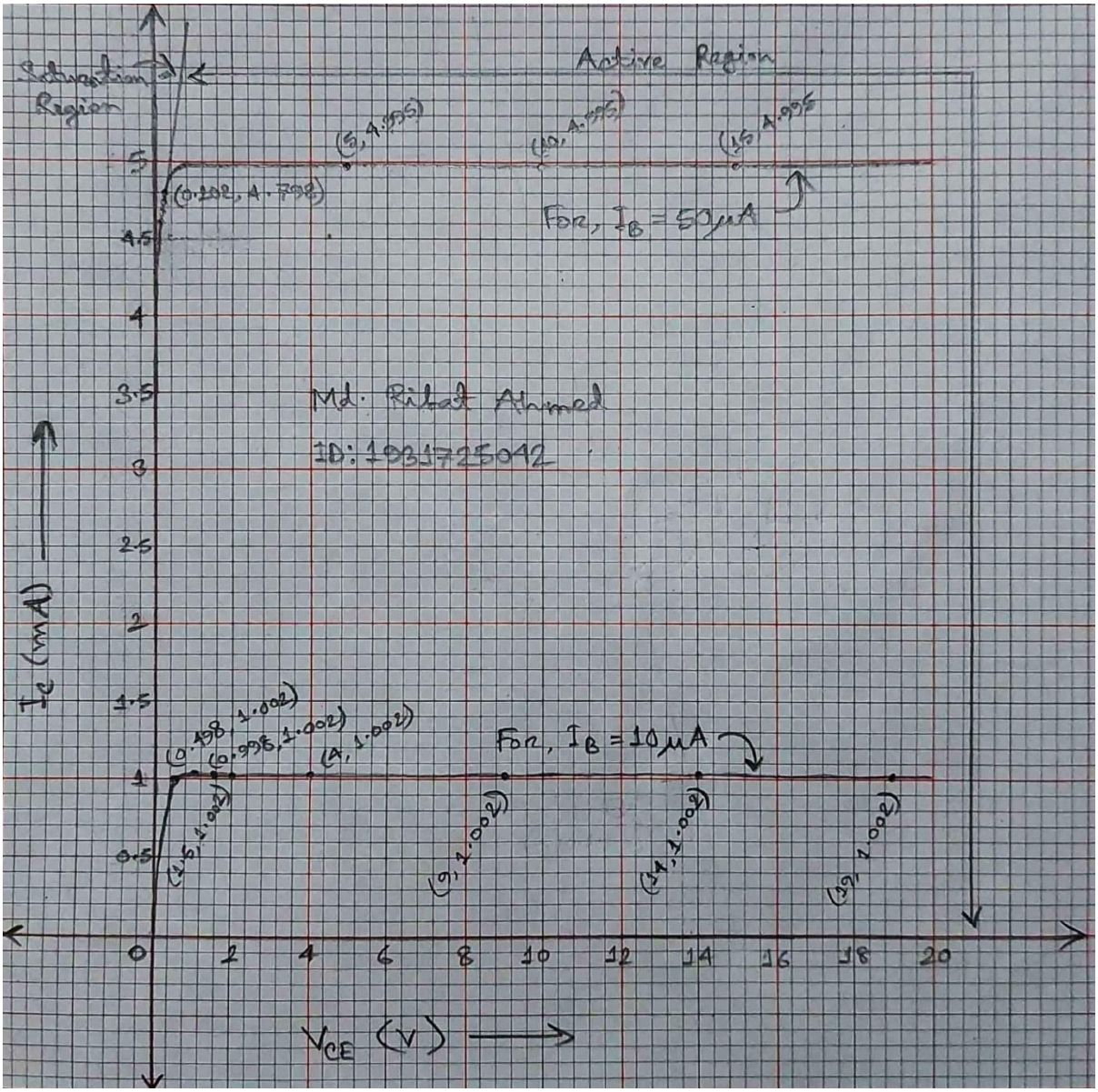

Figure 4 – Output Characteristics Graph of BJT for I_B = 10µA & 50µA