# Ahsanullah University of Science & Technology

## Department of Computer Science & Engineering

## LAB REPORT

**Course No** : **EEE-2142**

**Course Title** : **Electronics Device & Circuits Lab**

**Experiment No** : **05**

**Experiment Name** : The output characteristics of CE (common emitter) configuration of BJT

**Submitted By-**


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**Group No** : **06**


**Date of Performance** : **31/08/2020**

**Date of Submission** : **10/09/2020**

Experiment No : 05

Name of the Experiment :

The output characteristics of CE (common emitter) configuration of BJT.

Objective :

Study of the output characteristics of CE (common emitter) configuration of BJT.

Equipments and Components :

| Serial No. | Component Details | Specification | Quantity |
|---|---|---|---|
| 1. | Transistor | C828 | 1 piece |
| 2. | Resistor | 470KΩ, 1KΩ | 1 piece each |
| 3. | POT | 100 KΩ | 1 unit |
| 4. | Trainer Board | | 1 unit |
| 5. | DC Power Supply | | 1 unit |
| 6. | Digital Multimeter | | 1 unit |
| 7. | Chords and wire | | as required |

## Experimental setup :

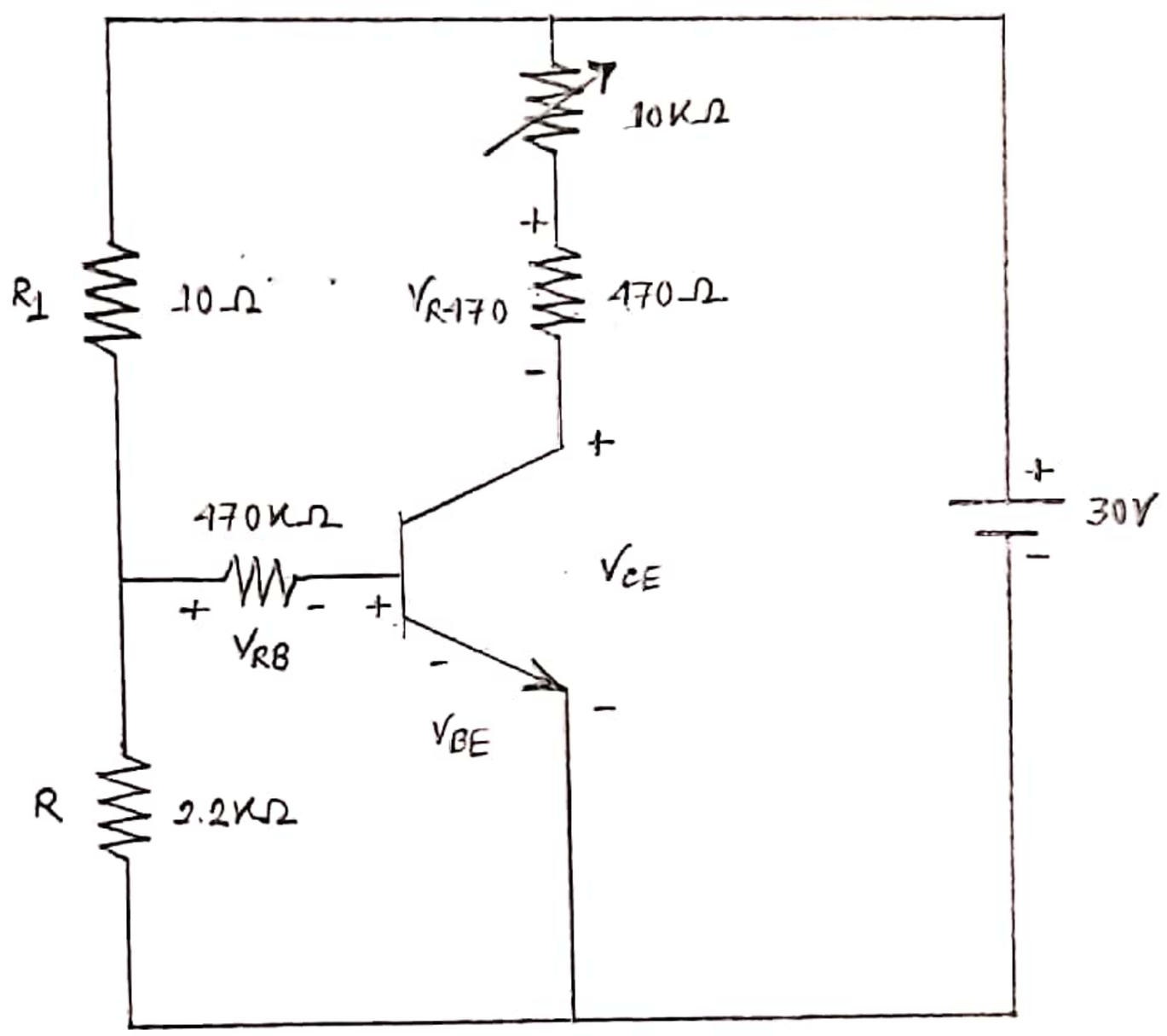



Figure : Experimental Circuit.

## Data Table :

| $V_{RB}$ (V) | $I_B = V_{RB}/470K$ ($\mu A$) | $V_{CE}$ (V) | $V_{R470}$ (V) | $I_C = V_{R470}/470$ (mA) |
|---|---|---|---|---|
| 4.63 | 9.85 | 0.05 | 0.19 | 0.40 |
| | | 0.08 | 0.35 | 0.74 |
| | | 0.09 | 0.51 | 1.09 |
| | | 0.11 | 0.66 | 1.40 |
| | | 0.12 | 0.88 | 1.87 |
| | | 0.19 | 1.73 | 3.68 |
| | | 3.05 | 1.97 | 4.19 |
| | | 7.8 | 2.06 | 4.38 |
| | | 12.66 | 2.13 | 4.53 |
| | | 17.81 | 2.14 | 4.56 |

## Calculation :

Here,

$$I_C = \frac{V_{R470}}{R}$$

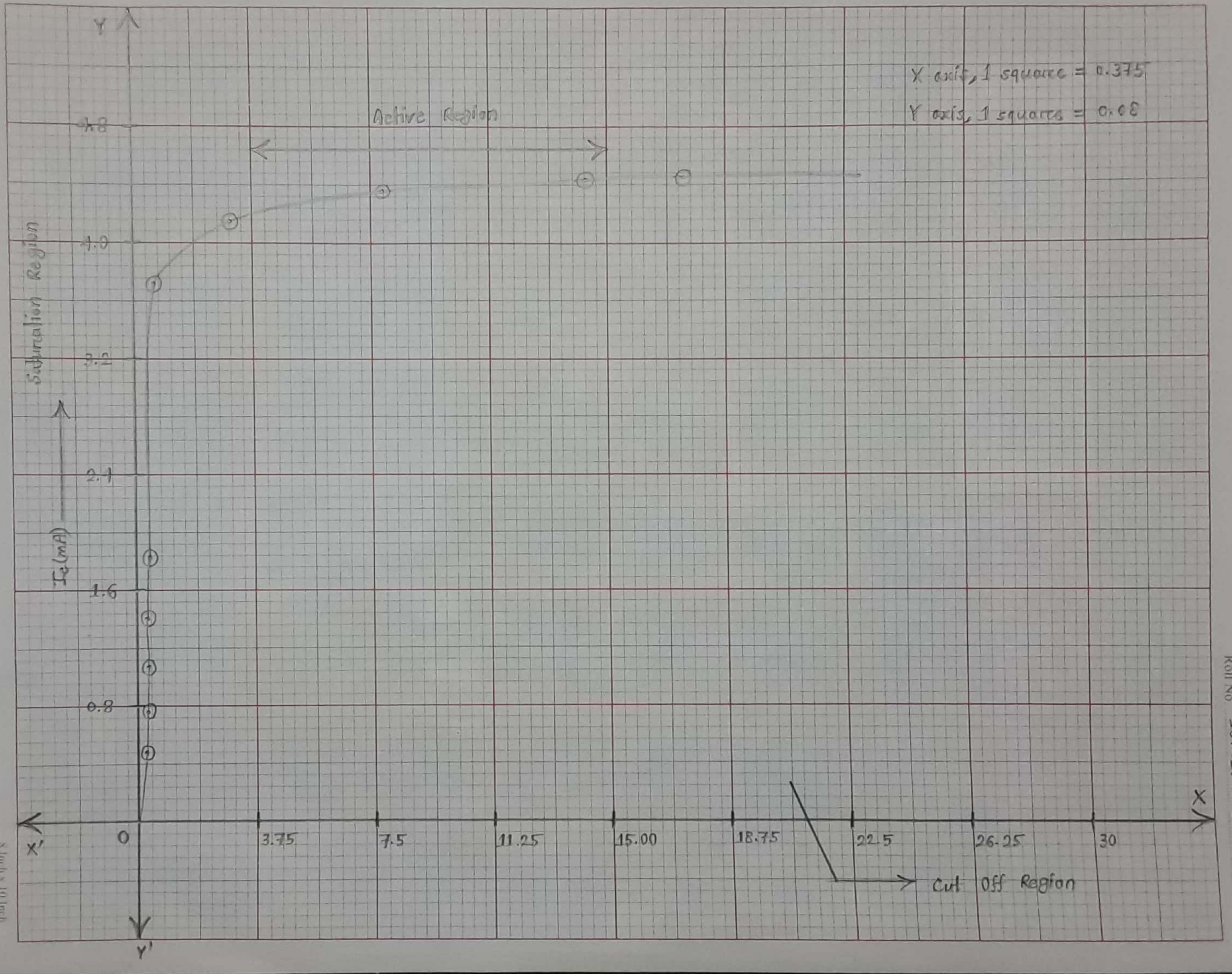
$$= \frac{0.19}{470}$$

$$= 0.4\ mA$$

Similarly, we get the others values of $I_C$ by Varying the pot.

## Report :

① Plot the graph of $I_C$ vs $V_{CE}$ with necessary details. Show the different regions of operation.

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8 Inch x 10 Inch

② Plot a hypothetical output characteristics using PNP transistor.

**Ans:** A hypothetical output characteristics using PNP transistor is given below :

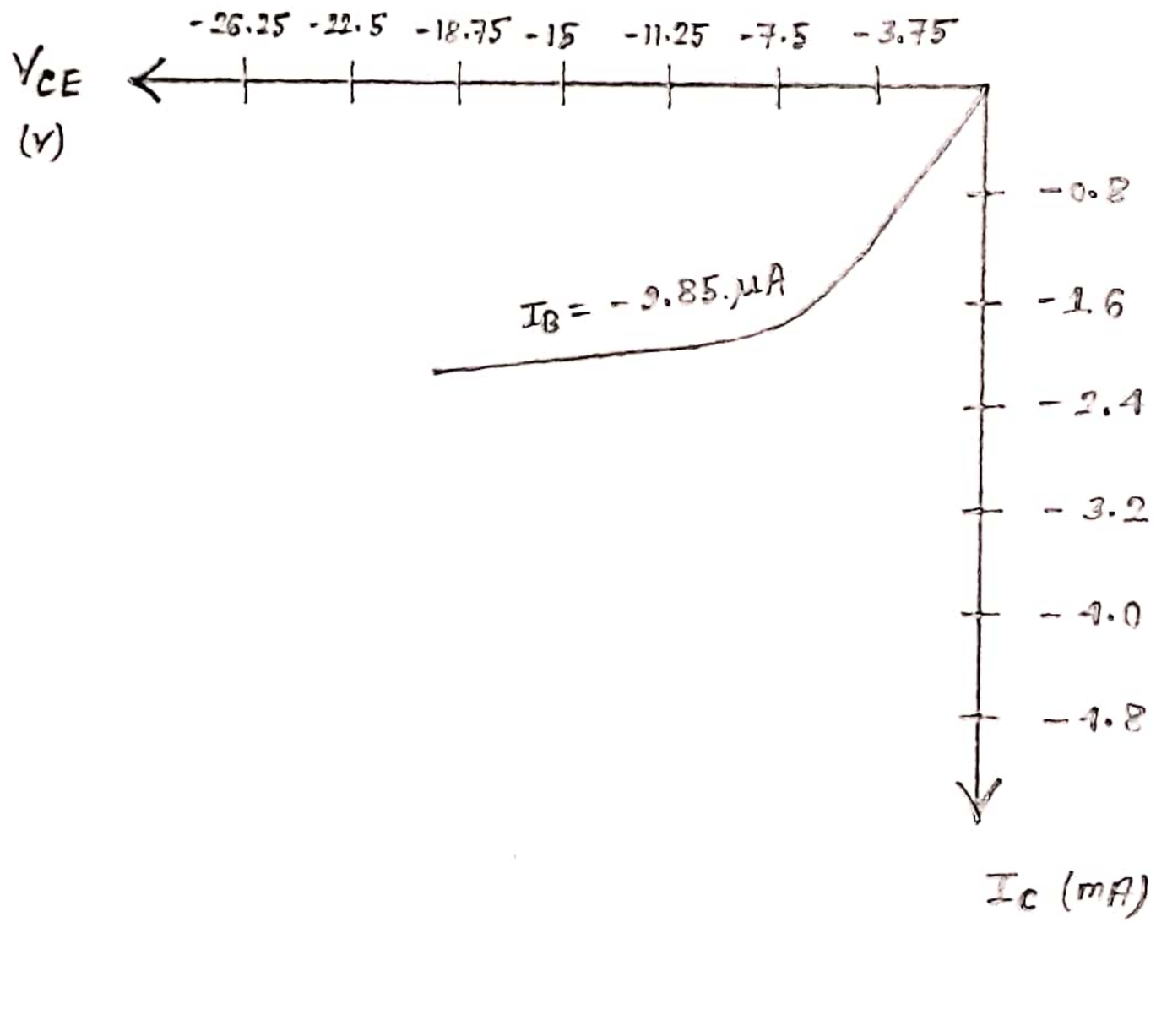


Figure : Hypothetical output characteristics using PNP transistor.

③ Find $\beta$ for the three different condition.

Ans: From the experiment,

$$I_C = 4.56\ mA$$

$$I_B = 9.85\ \mu A$$

Here,

$$\beta = \frac{I_C}{I_B}$$

$$= \frac{4.56\ mA}{9.85\ \mu A}$$

$$= 463$$

As, $V_{BB}$ is fixed, so only one value of $I_B$ can be measured. The value of $\beta$ is 463 in this experiment.

Discussion :

In this experiment, we have studied the output characteristics of CE (common emitter) configuration of BJT. Common emitter configuration is mostly used because it provides the voltage gain required for most of the day to day applications. The experiment was done successfully.