AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING (EEE)

EXPERIMENT NO.	**:**	**06**
NAME OF THE EXPERIMENT	**:**	**STUDY OF BJT BIASING CIRCUIT.**
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ID	**:**	**22-46013-1**
COURSE TITLE	**:**	**ELECTRONIC DEVICES LABORATORY**
SECTION	**:**	**Q**
GROUP NO.	**:**	**05**
DATE OF PERFORMANCE	**:**	**MARCH 21, 2023**
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Objectives of The Experiment:

Thise experiment aims to analyze four different BJT biasing circuit for two different β values to determine the stability of the operating point and establish a proper operating point that is not sensitive to temperature or BJT β variations. The experiment will involve calculating small signal BJT model parameters, eliminating DC sources, and analyzing the resulting circuit for voltage amplification, current amplification, input impedence, output impedence, and phase relation between input and output voltages.

List of Components:

1. Trainer Board
2. Transistor (C828) NPN, (BD135) NPN
3. Resistor ($R_E = 3.4\,k\Omega$, $R_B = 538\,k\Omega$)
4. DC Power Supply ($V_{CC} = +15\,V$)
5. Multimeter
6. Power supply cable

Diagram:

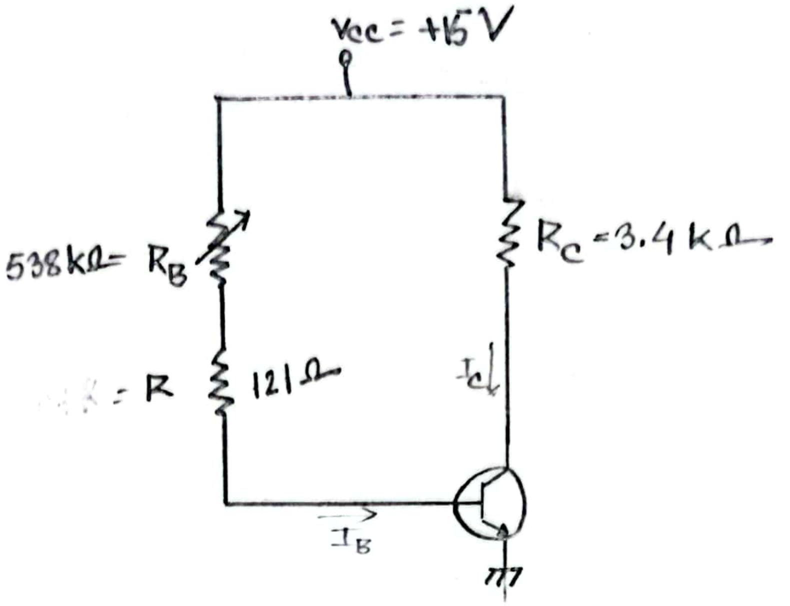

Figure: 1 Fixed Biasing circuit.

Working Principle Circuit:

In a fixed bias configuration circuit we used a transistor, 3 Resistor and a DC source. Applying DC source we got voltage V_{CE}, V_{BE} and V_{RC}. Form that we can determine I_C an I_B very eacily.

The fixed bias circuit is the simplest dc biasing configuration. The current direction are the actual current direction and voltages. For the dc analysis of the network can be isolated can be isolated. [1]

Data and Calculations:

	β	V_{CE} (V)	V_{BE} (V)	V_{RC} (V)	I_C (mA)	I_B
Figure-1	106	7.5	0.73	7.66	2.25 mA	0.021
	103	7.5	0.72	7.57	2.22 mA	0.021
% of change	2.83%	0%	1.37%	1.17%	1.33%	0%

when $\beta = 106$, $V_{RC} = 7.66$ V

$$I_C = \frac{V_{RC}}{R_C} = \frac{7.66}{3.4} = 2.25 \text{mA}$$

when $\beta = 103$, $V_{RC} = 7.57$ V

$$I_C = \frac{V_{RC}}{R_C} = \frac{7.57}{3.4} = 2.22 \text{mA}$$

% change for, $\beta = \frac{106-103}{106} \times 100 = 2.83\%$

% Change for, $V_{CE} = 0\%$

% Change for, $V_{BE} = \frac{0.73-0.72}{0.73} \times 100 = 1.37\%$

% Change for $V_{RC} = \frac{7.66-7.57}{1.17} \times 100 = 1.17\%$

% Change for $I_C = \frac{2.25-2.22}{2.25} \times 100 = 1.33\%$

% change for, $I_B = 0\%$

Discussion:

In this experiment we learned how to establis the proper operating point and how to stability of the operating point with respect of changing β in different circuits. First of all, we measured the transistor β value and construct the circuit to obtani I_B and I_C value. By changing the bias current I_B, we saw collector current I_C changed with allmost β times.

There might by some error whill taking values from multimete because sometimes redings are flapchuating very much. Also loose connection are create some errors as well.

We can solve this by measuring values multiple times and construct the circuit more carefully.

Conclusion:

By conducting this experiment, we gain practical knowledge to analyzing and interpting the BJT biasing circuit. we also able to determine the proper operating point and changing β in different biasing circuit.

Remarks:

The study of a biasing BJT circuit is a fundamental experiment for us. This experiment allows us to understanding operating point with respect to changings β in different biasing circuits.

List of References:

[1] Electronic Devices & Circuit Theory. 11th edittion
Page: 163

[2] American International University-Bangladesh (AIUB) Electronic Devices Lab Mannual.

1(a)

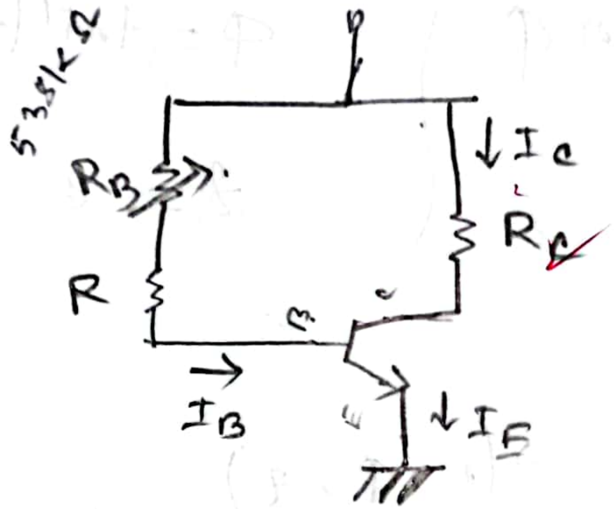

fig: 1(a)

ID: 22-46013-1
Date: 21.3.23

Data table

	B	V_{CE}	V_{BE}	V_{RC}	I_C	I_B
Fig 1(a)	106	7.5	.73	7.66	2.25mA	0.021
	103	7.5	.72	7.57	2.22mA	0.021
% of Charge	2.83	0%	1.37	1.175	1.33%	0%

ID=22-46013-1
Date: 21.3.23