Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

LAB REPORT

Course No : EEE-2142

Course Title : Electronics Device & Circuits Lab

Experiment No : 06

Experiment Name : The BJT Biasing Circuits

Submitted By-

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Section : B(B2)

Group No : 06

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Experiment No : 06

Name of the Experiment : The BJT Biasing Circuits.

Objective : Study of the BJT Biasing Circuits.

Equipments And Components :

Serial No.	Component Details	Specification	Quantity
1.	NPN Transistors	C828, BD135	1 piece each
2.	Resistors	470Ω, 560Ω, 220KΩ	1 piece each
3.	POT	10KΩ	1 unit
4.	Trainers Board		1 unit
5.	DC Powers Supply		1 unit
6.	Digital Multimeters		1 unit
7.	Chords and wires		as required

Experimental setup :

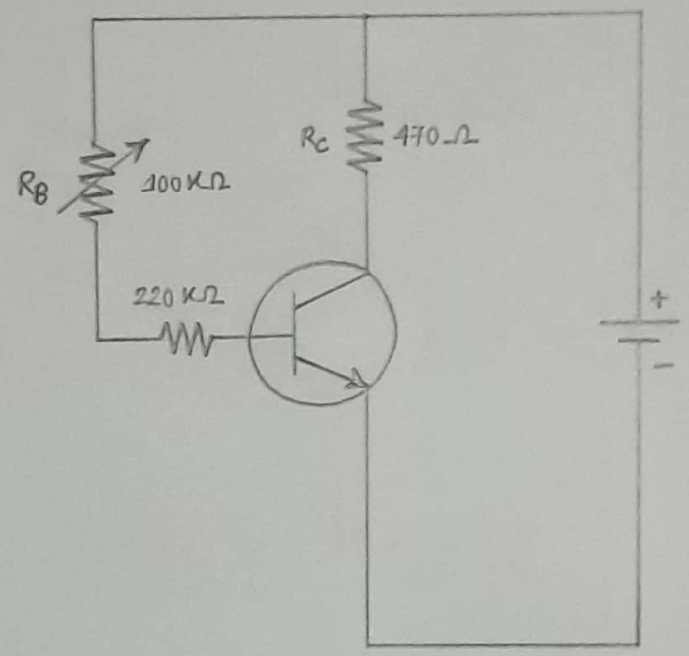


Figure : Fixed Bias Circuit

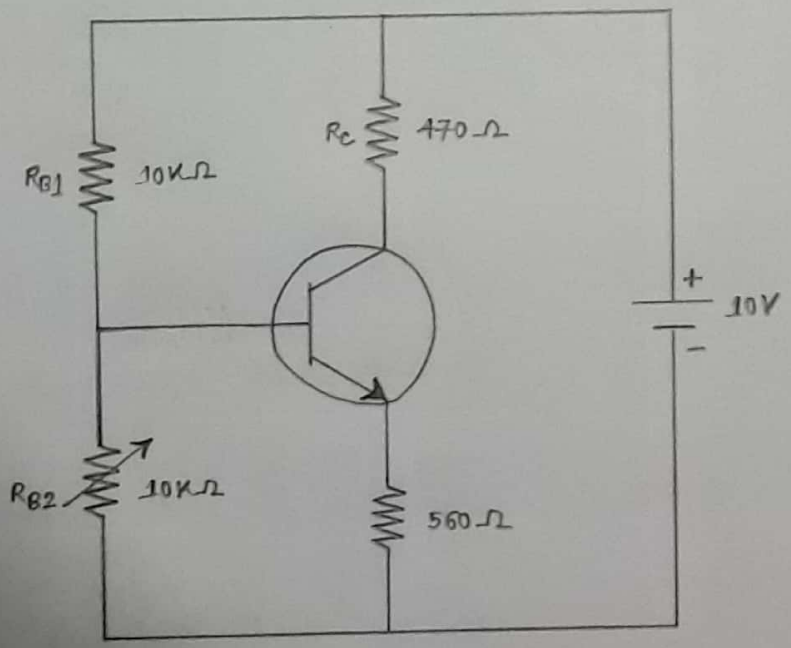


Figure : self Bias Circuit

Data sheet :

Table – 1 : Data for Fixed Bias Circuit

Transistor	R_c (Ω)	V_c (volt)	$I_c = V_c / R_c$ (mA)	V_{CE} (volt)	Q – point
C828	466	4.34	9.313	5.05	(5.05, 10.44)
BD135	466	4.16	8.927	5.24	(5.24, 10)

Table – 2 : Data for Self Bias Circuit

Transistor	R_c (Ω)	V_c (volt)	$I_c = V_c / R_c$ (mA)	V_{CE} (volt)	Q – point
C828	466	2.2	4.72	4.97	(4.97, 4.8)
BD135	466	2.23	4.78	4.91	(4.91, 5.16)

Calculation :

I_c for fixed – bias circuit,

$$I_c = \frac{V_{cc}}{R_c} = \frac{10V}{466} = 21.45 \text{ mA}$$

I_c for self – bias circuit,

$$I_c = \frac{V_{cc}}{R_c + 560} = \frac{10}{466 + 560} = 9.74 \text{ mA}$$

Report :

① Which circuit shows better stability ? Explain in the context of the results obtained in the laboratory.

Answer :

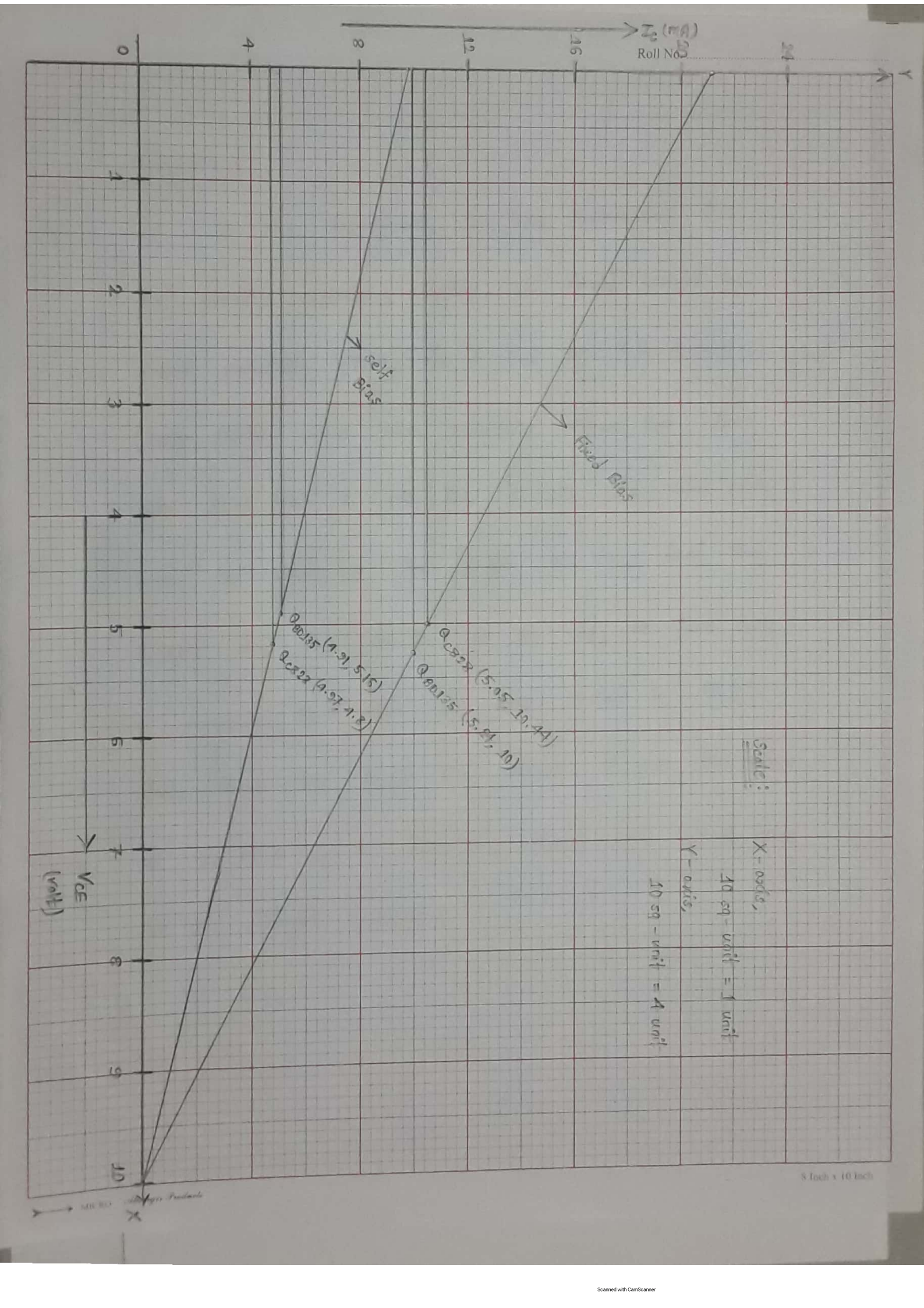
The self bias circuit shows better stability. In this experiment, two biasing circuits were used to study the BJT biasing circuits. They were : ① Fixed Bias Circuit & ② self Bias Circuit. In fixed bias circuit, the values of I_C, V_C & V_{CE} has been different for two different transistors (C828 & BD135). But their resistor R_C was same. The difference is much more variable because BJT is temperature dependent and for this reason the circuit show more variability. On the other hand, in self bias circuit, the value of I_C, V_C & V_{CE} were almost same for the two different transistors. For all of this

reason we can say that the self bias circuit shows more stability.

② Draw the DC load line for both the circuits and show the Q-point.

Answer :

The DC load line for both the circuits and the Q-points are shown in the attached graph.



Discussion :

In this experiment, we have implemented the BJT biasing circuits. Firstly, we should connect the circuit carefully. Then, V_{RC} & V_{CE} for both transistors (C828, BD135) were taken carefully. After that, for both fixed bias & self bias circuits the value were taken. By observing the graph we have found the Q-point for the circuits. At the end, we have come to conclusion that the self bias circuit is more stable than the fixed bias circuit because the values of I_C, V_C & V_{CE} in self bias circuit were almost same for two different transistors.