

NEUB CSE 214 LAB 5

North East University Bangladesh

Department of CSE

Course no: CSE 214

Experiment no: 05

Experiment Name: Characteristics OF CE & CB Configuration.

CAUTIONS:

1. Don't switch on the supply of the circuit until you have verified the circuit carefully
2. Take readings of apparatus carefully
3. Take care of any bare circuit elements in energized condition
4. Never try to touch bare live wires

Objective

The objective of this experiment is

- To obtain common emitter characteristics of NPN transistor.
- To obtain common base characteristics of NPN transistor

Theory

Theory needed for this lab should be read from lecture 5 of theory course.

Apparatus Needed

- Trainer Board (Bread board)
- NPN transistor
- Resistor (1K Ω , 10K Ω , 100K Ω)
- Capacitor
- DC Voltmeter
- DC Ammeter
- DC power supply
- Connecting wires

Part A: Common Emitter configuration

Procedure

Input characteristics

1. Connect circuit as shown in Figure 1
2. Connect variable power supply 0-15V at base circuit and collector circuit.
3. Keep V_{CC} fix at 0V (Or do not connect V_{CC})
4. Increase V_{BB} from 0V to 15V, note down readings of base current I_b and base to emitter voltage V_{be} in the observation table 1.
5. Repeat above procedure for $V_{CC} = +5V$ and $V_{CC} = +10V$
6. Draw input characteristics curve. Plot V_{be} on X axis and I_b on Y axis.

Output characteristics

1. Connect circuit as shown in Figure 2
2. Connect variable power supply 0-15V at base circuit and collector circuit.
3. Keep base current fix (Initially 0)
4. Increase V_{cc} from 0V to 15V, note down readings of collector current I_c and collector to emitter voltage V_{ce} in the observation table 2.
5. Repeat above procedure for $I_b=5\mu A$, $50\mu A$, $100\mu A$. Increase base current by increasing V_{bb}
6. Draw output characteristics curve. Plot V_{ce} on X axis and I_c on Y axis.

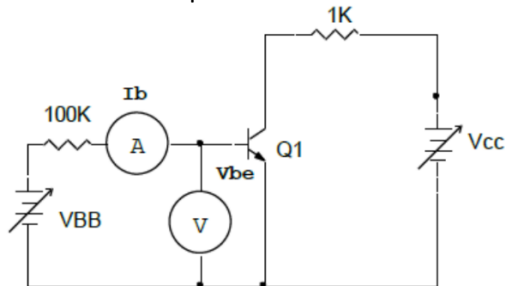


Figure 1 Circuit setup for input characteristics for CE configuration

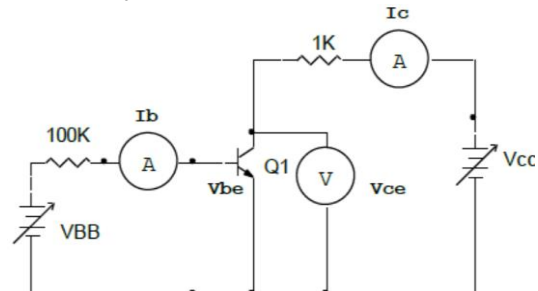


Figure 2 Circuit setup for output characteristics of CE configuration

NEUB CSE 214 LAB 5

Table 1

Sl. No.	$V_{CC}=0V$		$V_{CC}=5V$		$V_{CC}=10V$	
	V_{be}	I_b	V_{be}	I_b	V_{be}	I_b
1						
2						
3						
4						
5						
6						

Table 2

Sl. No.	$I_b=0$		$I_b=5\mu A$		$I_b=50\mu A$		$I_b=100\mu A$	
	V_{ce}	I_c	V_{ce}	I_c	V_{ce}	I_c	V_{ce}	I_c
1								
2								
3								
4								
5								
6								
7								
8								

Part B: Common Base configuration

Procedure

Input characteristics

1. Connect circuit as shown in Figure 3
2. Connect variable power supply 0-15V (V_{EE}) at emitter base circuit and another power supply 0-15V at collector base circuit (V_{CC}).
3. Keep V_{CC} fix at 0V (Or do not connect V_{CC})
4. Increase V_{EE} from 0V to 15V, note down readings of emitter current I_e and emitter to base voltage V_{eb} in the observation table 3.
5. Repeat above procedure for $V_{CC} = +5V$ and $V_{CC} = +10V$
6. Draw input characteristics curve. Plot V_{eb} on X axis and I_e on Y axis.

Output characteristics

1. Connect circuit as shown in Figure 3
2. Connect variable power supply 0-15V at base circuit and collector circuit.
3. Keep base current fix (Initially 0)
4. Increase V_{CC} from 0V to 15V, note down readings of collector current I_c and collector to base voltage V_{cb} in the observation table 4.
5. Repeat above procedure for $I_e=1\mu A, 5\mu A, 10\mu A$. Increase base current by increasing V_{EE} .
6. Draw output characteristics curve. Plot V_{cb} on X axis and I_c on Y axis.

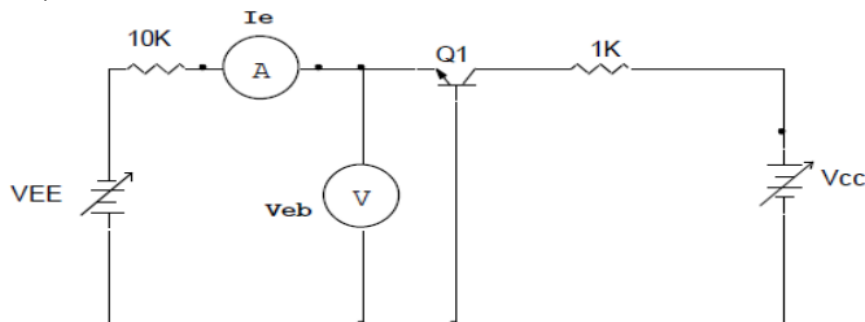


Figure 3 Circuit diagram to obtain input characteristics of CB configuration

NEUB CSE 214 LAB 5

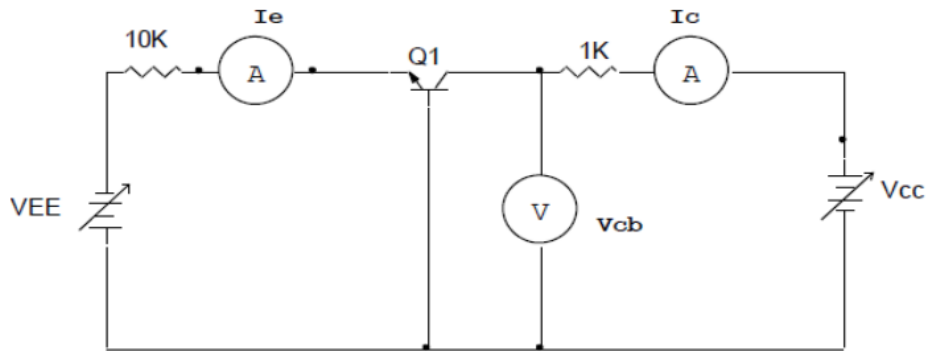


Figure 4 Circuit diagram to obtain output characteristics of CB configuration

Table 3

Sl. No.	$V_{cc}=0V$		$V_{cc}=5V$		$V_{cc}=10V$	
	V_{eb}	I_e	V_{eb}	I_e	V_{eb}	I_e
1						
2						
3						
4						
5						
6						

Table 4

Sl. No.	$I_e=0$		$I_e=1\mu A$		$I_e=5\mu A$		$I_e=10\mu A$	
	V_{cb}	I_c	V_{cb}	I_c	V_{cb}	I_c	V_{cb}	I_c
1								
2								
3								
4								
5								
6								
7								
8								

Report

1. Mention the npn transistor used in the lab.
2. Find the datasheet and include common parameters of the BJT
 - a. β
 - b. Input characteristics curve
 - c. Output characteristics curve
3. Complete all the table
4. Plot the graph
5. Comment on the learnings from this LAB