Marmara University

Faculty of Engineering

ELECTRICAL & ELECTRONICS ENGINEERING DEPARTMENT

EE232 Exp. #4

BJT Basics

Report #4

COURSE LECTURER:

Associate Professor Dr. Emre Arslan

LABORATORY INSTRUCTOR:
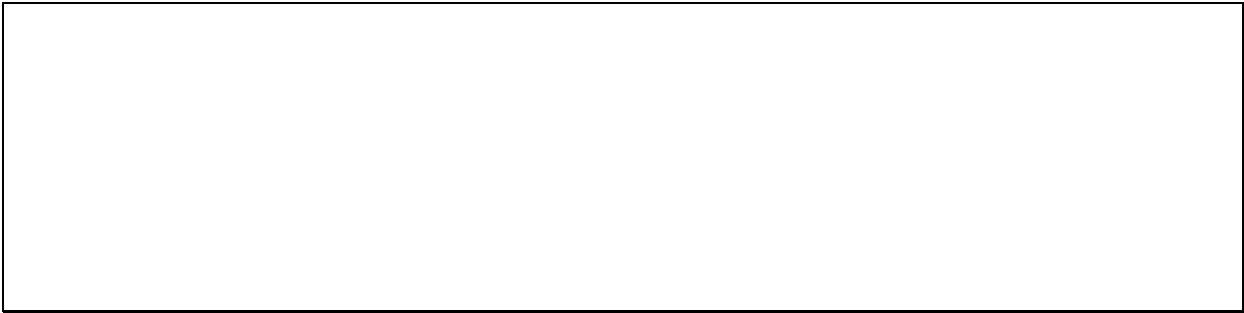
Research Assistant Deniz Özenli

Prepared by

Name:

Surname:

#ID:

Part 1--Introduction: Explain the main objective of the first experiment on your own words. (10pt)

Part 2--Procedure: a) Bipolar Junction Transistor: i) Explain BJT operating mechanism briefly. **ii)** Why is 'β' coefficient very important factor in integrated circuits with BJT? **iii)** Draw small signal equivalent circuit of a NPN BJT. **iv)** Describe and explain the meanings of operating regions of a BJT. Which regions are preferred in amplification circuits? Why? (20pt)

b) Find the DC operating points of the following circuit by taking as $\beta = 200$, $V_{BE} = 0.7V$, $R_B = 1M$, $R_C = 2.2k$, $V_{CC} = 10V$. Compare your calculation results with measured results in the 2, 3 and 5.steps during the lab. If there are some differences, explain them. (15pt)
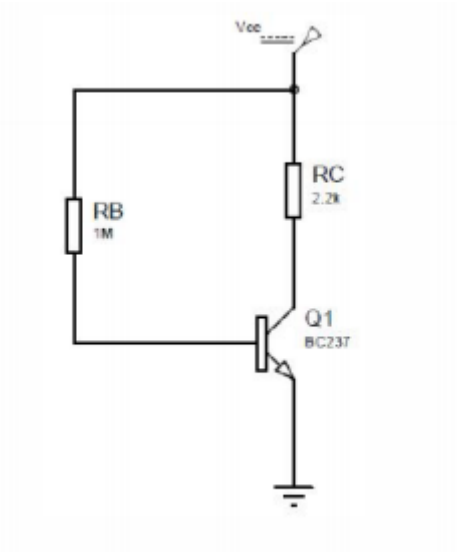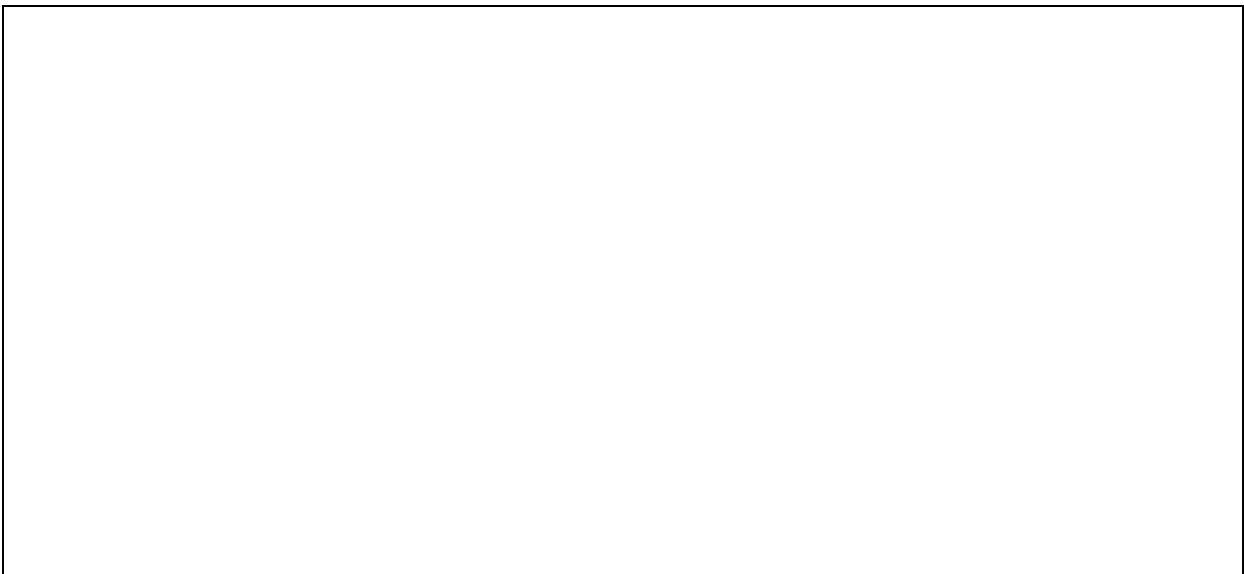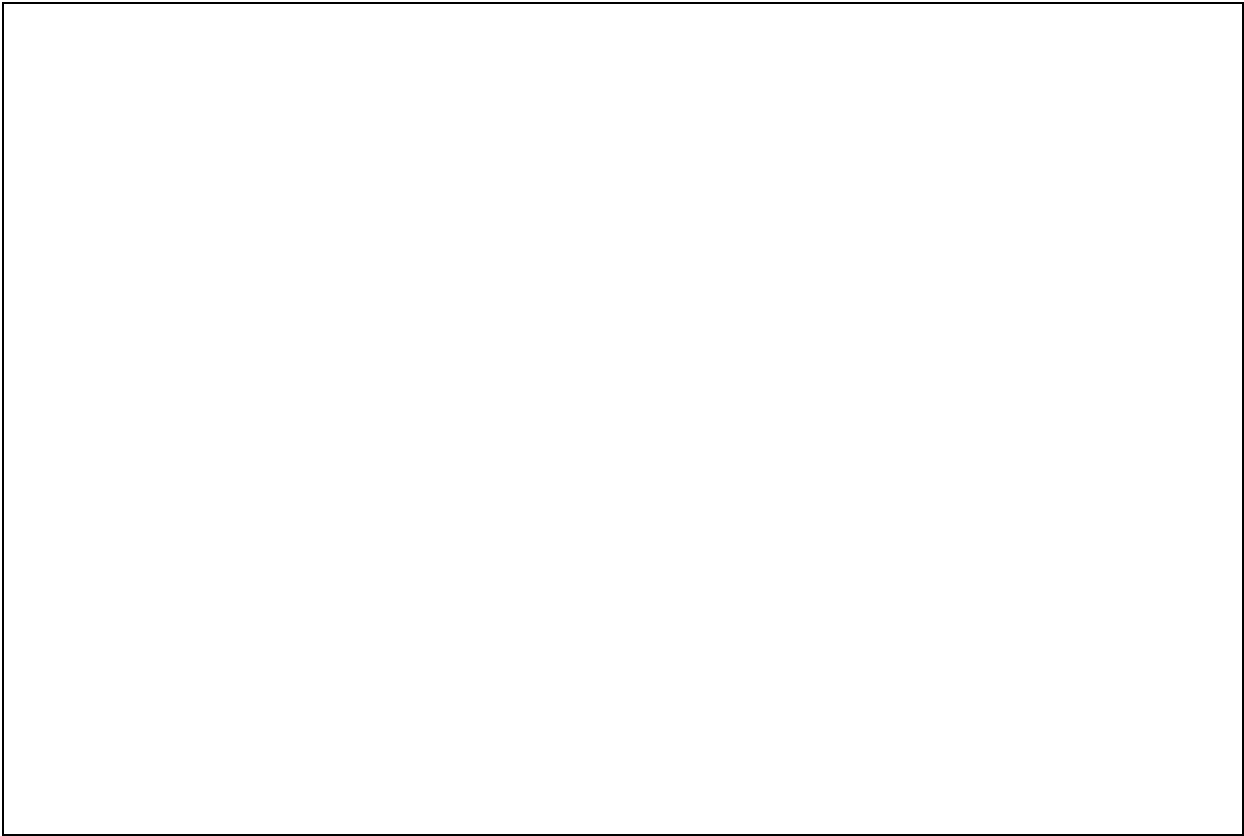

Figure.1

c) Find the DC operating points of the following circuit by taking as $\beta = 200$, $V_{BE} = 0.7V$, $R_E = 560$, $R_C = 2.2k$, $R_1 = 33k$, $R_C = 5.6k$ $V_{CC} = 10V$. Compare your calculation results with measured results in the 7 and 8.steps during the lab. If there are some differences, explain them. (15pt)
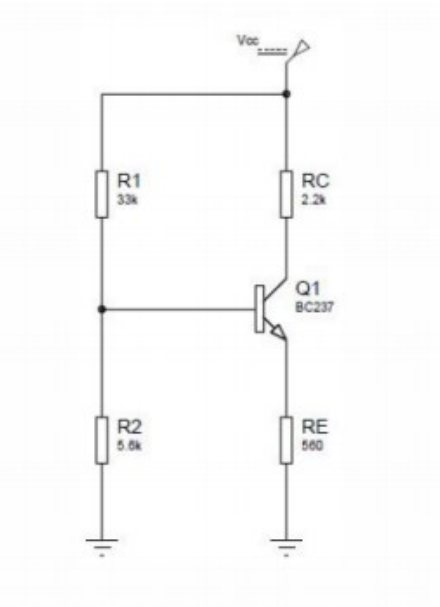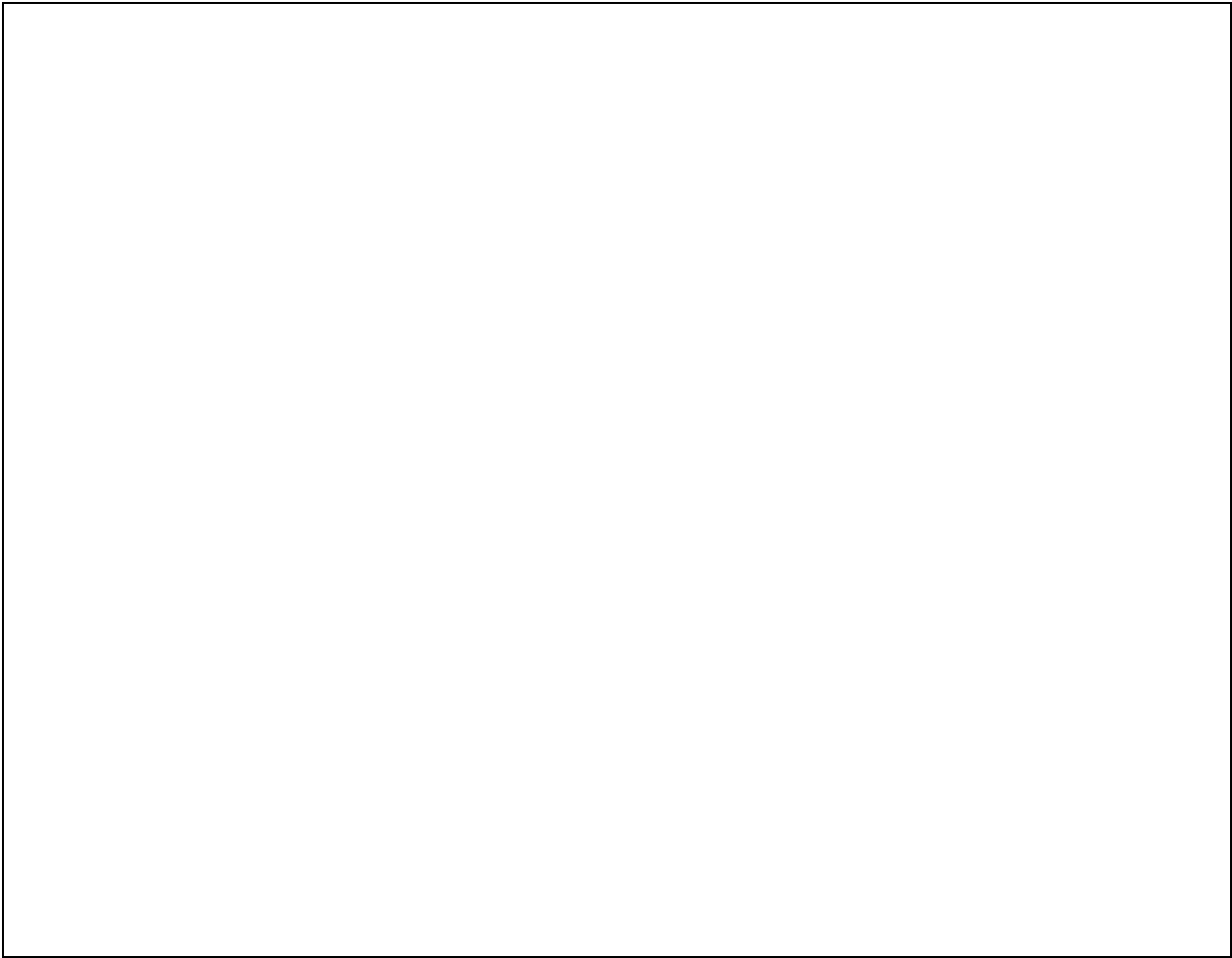

Figure.2

d) Find the AC gain of the following circuit by taking as $\beta = 200$, $V_T = 25mV$, $V_{BE} = 0.7V$, $R_E = 560$, $R_C = 2.2k$, $R_1 = 33k$, $R_C = 5.6k$ $V_{CC} = 10V$. (20pt). **Hint:** Use –pi- equivalent model.
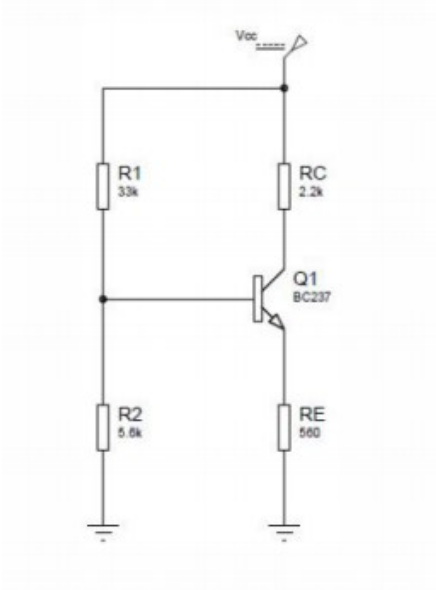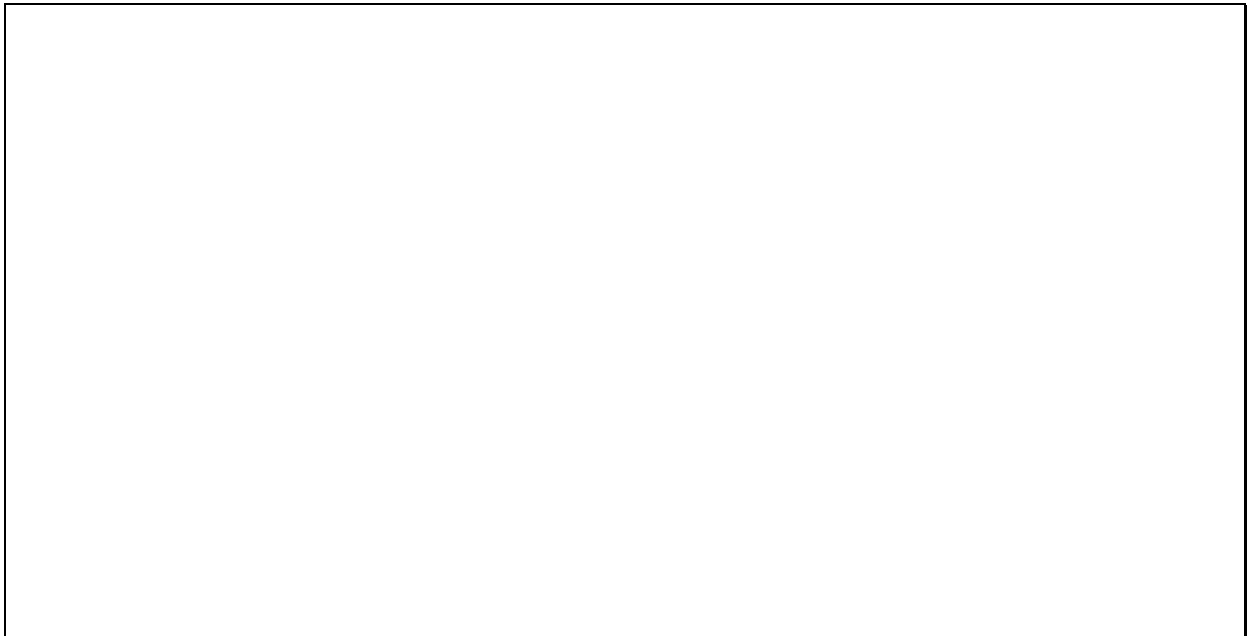

| R1 | RC |
| 33k | 2.2k |

Q1
BC237

| R2 | RE |
| 5.6k | 560 |

Voc

Figure.3

Part-3--Conclusion: Conclude your report with your learning from this experiment on your own words. Moreover, you can discuss or criticize some over-expected or under-expected sides of the experiment. (10pt)

Part-4--References: If you have referred parts, specify their references below. (10pt)