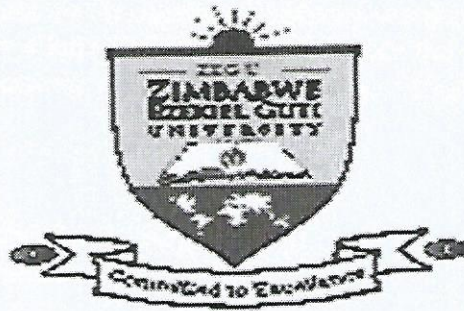


# ZIMBABWE EZEKIEL GUTI UNIVERSITY



## FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

Department of Digital Technology

Module: CDT 115 Electronics 2

Exam Duration: 3 hours

End of Semester Examination 30 May 2019

### Instructions

- (i) Answer all questions, the mark allocation for each question is shown in square brackets.
- (ii) Number your answers accordingly.
- (iii) The total marks for the examination is 100.

### Question 1

- Explain what is meant by the common emitter connection. [4]
- In a transistor if  $I_C = 4.9\text{mA}$  and  $I_E = 5\text{mA}$ , Calculate the value of  $\alpha$ . [3]
- Calculate  $I_E$  in a transistor for which  $\beta = 30$  and  $I_B = 15\mu\text{A}$ . [3]

### Question 2

- Explain the term ROM (Read only Memory). [3]
- What are the applications of ROM. [7]

### Question 3

- Explain the common base connection in transistors. [4]
- In a common base connection,  $I_E = 1\text{mA}$ ,  $I_C = 0.95\text{mA}$ . Calculate the value of  $I_B$ . [3]
- In a common base connection transistor, current amplification factor is 0.7. If the emitter current is  $1\text{mA}$ . Calculate the value of  $I_B$ . [3]

### Question 4

Define the following terms as used in the logic family:

- Fan in. [2]
- Propagation delay. [2]
- Fan out. [2]
- Power dissipation. [2]
- Noise immunity. [2]

### Question 5

- What is faithful amplification? [2]
- What is transistor biasing? [2]
- Explain the conditions to be fulfilled to achieve faithful amplification in a transistor amplifier. [6]

### Question 6

- How does a transistor work as an amplifier? [5]
- In a common base connection,  $\alpha = 0.90$ . The voltage drop across  $3\text{k}\Omega$  resistance which is connected in the collector is  $3\text{V}$ . Calculate the base current. [5]

### Question 7

Define the following terms as used in the transistors:

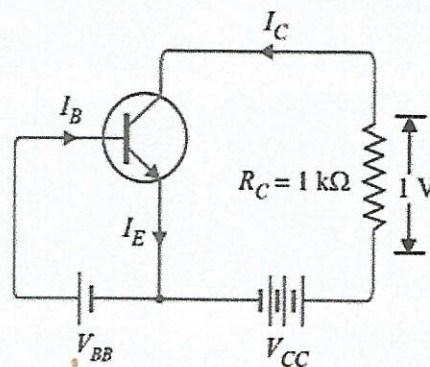
- a. Thermal runaway. [2]
- b. Temperature dependence. [2]
- c. Stabilization. [2]
- d. Operating point. [2]
- e. Stability. [2]

### Question 8

The logic families are classified into two types: (i) Bipolar logic families, and (ii) Unipolar logic families.

- a. Explain the two terms. [4]
- b. Give three examples of bipolar logic family. [3]
- c. Give three examples of unipolar logic family. [3]

### Question 9



- a. For a transistor,  $\beta = 45$  and voltage drop across  $1\text{k}\Omega$  which is connected in the collector circuit is 1 volt as shown in the above diagram. Calculate the base current for common emitter connection. [6]
- b. Given that the value of  $\alpha = \Delta I_C / \Delta I_E$  and  $\beta = \Delta I_C / \Delta I_B$ . Determine the relation between  $\alpha$  and  $\beta$ . [4]

### Question 10

- a. Explain how a pnp transistor work. [5]
- b. Compare the working of the pnp transistor and of then pn transistor. [5]