



GARISSA UNIVERSITY

UNIVERSITY EXAMINATION **2017/2018** ACADEMIC YEAR **ONE** **THIRD** SEMESTER EXAMINATION

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCE
FOR THE DIPLOMA IN INFORMATION TECHNOLOGY

COURSE CODE: DIT 028

COURSE TITLE: DIGITAL ELECTRONICS

EXAMINATION DURATION: 2 HOURS

DATE: 08/08/18

TIME: 9.00-11.00 AM

INSTRUCTION TO CANDIDATES

- The examination has **SIX (6)** questions
- Question **ONE (1)** is **COMPULSORY**
- Choose any other **THREE (3)** questions from the remaining **FIVE (5)** questions
- Use sketch diagrams to illustrate your answer whenever necessary
- Do not carry mobile phones or any other written materials in examination room
- Do not write on this paper

This paper consists of **FOUR (4)** printed pages

please turn over



QUESTION ONE (COMPULSORY)

- a. Differentiate between intrinsic and extrinsic semiconductors. [4 Marks]
- b. Define the following terms: [3 Marks]
- Conductor
 - Insulator
 - Semiconductor
- c. State six characteristics of semiconductors. [6 Marks]
- d. Describe briefly how you can obtain a P-N junction using a well-illustrated diagram. [5 marks]
- e. Define doping [2 Marks]
- f. Sketch the p-n junction diode symbols for both forward and reverse bias. [5 Marks]

QUESTION TWO

- a. What do you understand by the term;
- I. 'Quiescent point'
- II. Logic gate [3 Marks]
- b. State the four transistor biasing methods. [4 Marks]
- c. compute the two's complement of the following binary numbers.
- 10010110 [4 Marks]
 - 10001001 [4 Marks]

QUESTION THREE

- a. Work out as indicated in brackets.
- $(1001.0101)_2$ (Binary –to- decimal conversion) [3 Marks]
 - $(1E0.2A)_{16}$ (Hexadecimal – to – decimal conversion) [4 Marks]
- b. State any two (2) advantages of digital systems. [2 Marks]
- c. Convert the following binary number to its decimal equivalent. [3 Marks]
- (1001.0101)
- d. Express the following binary number into their 2's complement. [3 Marks]
- 10010110

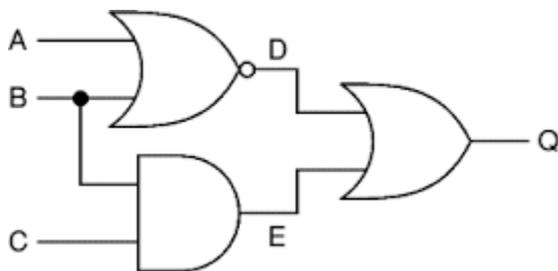


QUESTION FOUR

- a. Define the term transistor. [2 Marks]
- b. A common emitter transistor has a reverse leakage current, $I_{CBO} = 48 \text{ nA}$ and a gain $\alpha = 0.992$.
 - . Find β and I_{CEO} [4 Marks]
 - . Find its exact collector current when $I_B = 30 \mu\text{A}$. [4 Marks]
 - . Find the approximate collector current neglecting leakage current. [2 Marks]
- c. State the three types of transistor static characteristics. [3 Marks]

QUESTION FIVE

- a. Convert the following binary number to their hexadecimal equivalents. [3 Marks]
 1001.1111
- b. Perform the following binary operations [6 Marks]
 - I. $00010011 + 00111110$
 - II. (b) $00110011 - 00010110$
 - III. (c) 00101001×00000110
- c. Provide logical expressions **D**, **E** & **Q** for the arrangement below. [6 Marks]



QUESTION SIX

- a. Complete the truth tables below for the basic operators indicated. [6 Marks]

AND

A	B	R
0	0	
0	1	
1	0	
1	1	



OR +

A	B	R
0	0	
	1	1
1	0	
1		1

NOT ‘

A	R
	1
1	

- b. simplify the following Boolean expression using DeMorgans’ theorem

[5 Marks]

$$\overline{A + \overline{BC}}$$

- c. Represent the simplified expression in a circuit diagram.

[4 Marks]

