



GARISSA UNIVERSITY

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

SCHOOL OF COMPUTER AND INFORMATION SCIENCE
FOR THE DIPLOMA INFORMATION TECHNOLOGY

COURSE CODE: DIT 028

COURSE TITLE: DIGITAL ELECTRONICS

EXAMINATION DURATION: 3 HOURS

DATE: 10/04/18

TIME: 2.00-5.00 PM

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]
- i. Conductor
 - ii. Insulator
 - iii. 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.
- i. 10010110 [4 marks]
 - ii. 10001001 [4 marks]

QUESTION THREE

- (a) Work out as indicated in brackets.
- i. $(1001.0101)_2$ (Binary –to- decimal conversion) [3 marks]
 - ii. $(1E0.2A)_{16}$ (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

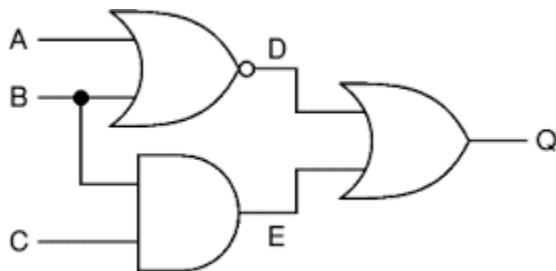


QUESTION FOUR

- (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 $\alpha = 0.992$.
 - i. Find β and I_{CEO} [4 marks]
 - ii. Find its exact collector current when $I_B = 30 \mu\text{A}$. [4 marks]
 - iii. 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]
 - i. 1001.1111
- (b) Perform the following binary operations [6 marks]
 - i. $00010011 + 00111110$
 - ii. $00110011 - 00010110$
 - iii. 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]

