

CHUKA



UNIVERSITY

## UNIVERSITY EXAMINATIONS

### FIRST YEAR EXAMINATION FOR THE AWARD OF CERTIFICATE IN COMPUTER SCIENCE

**COMP 00108: INTRODUCTION TO DIGITAL LOGIC AND DATA  
COMMUNICATIONS**

**STREAMS: CERT COMP SCI Y1S2**

**TIME: 2 HOURS**

**DAY/DATE:.....**

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#### INSTRUCTIONS:

- Answer question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, No reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.
- Marks are awarded for clear and concise answers.

#### SECTION A (Answer ALL questions in this section)

##### QUESTION ONE (30 Marks)

- a) State any THREE design factors of guided transmission medium [3Marks]
- b) What is the difference between Combinational and Sequential circuits? [4Marks]
- c) Define the following terms
  - i. Transistors [2Marks]
  - ii. Diodes [2 Marks]
- d) Highlight FOUR components of data communication. [4Marks]
- e) Name THREE examples of guided transmission medium. [3Marks]
- f) Draw the truth tables of the following logic gates.
  - i. XOR [3Marks]
  - ii. NOT [2Marks]
- g) Draw the circuit diagram and truth table for S-R flip – flop. [4Marks]
- h) List THREE causes of errors on a communication line [3 marks]

**SECTION B (Answer any TWO questions)**

**QUESTION TWO (20 Marks)**

a) Using well-labelled diagrams, explain the function of each of the following circuits:

i. Register (5 Marks)

ii. Counter (5 Marks)

b) Draw a truth table and the logic gate implementation of the Boolean equation below:

$$F = (\overline{A} \overline{B} \overline{C}) (\overline{A} \overline{B} C) \quad [10 \text{ Marks}]$$

**QUESTION THREE (20 Marks)**

a) Giving an example, explain Simplex, Half duplex and Full duplex

[6 marks]

b) What is meant by data transmission impairment, give THREE types of wireless transmission impairment [8Marks]

c) Discuss the THREE ways in which unguided signals can travel [6Marks]

**QUESTION FOUR (20 Marks)**

a) Using NAND gates only, draw a logic gate implementation to realize the AND gate, OR gate and NOT Gate. [6Marks]

b) Using NOR gates only, draw a logic gate implementation to realize the AND gate, OR gate and NOT Gate. [6Marks]

c) With the aid of a diagram, explain parity checking error detection technique. [8Marks]

**QUESTION FIVE (20 Marks)**

- a) Discuss the TWO basic synchronization techniques used in data transmission  
[10 Marks]
- b) With the aid of a diagram, differentiate between parallel and serial transmission modes  
[6 Marks]
- c) What is the difference between discrete and integrated circuits? [4 Marks]