

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

RESIT/SPECIAL EXAMINATION

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

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

STREAMS: CERT COMP SCI Y1S2

TIME: 2 HOURS

DAY/DATE: MONDAY 01/02/2021

11.30 A.M – 1.30 P.M

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) What is the difference between Combinational and Sequential circuits? [4 Marks]
- b) State any THREE design factors of guided transmission medium [3 Marks]
- c) Define the following terms
 - i. Transistors [2Marks]
 - ii. Diodes [2 Marks]
 - iii. LSI [2 marks]
 - iv. MSI [2 marks]
 - v. SSI [2 marks]
- d) Highlight FOUR components of data communication. [4Marks]
- e) Name THREE examples of guided transmission medium. [3Marks]
- f) Draw the circuit diagram for S-R flip – flop. [3Marks]

- g) List THREE causes of errors on a communication line [3 marks]

SECTION B (Answer any TWO questions)

QUESTION TWO (20 Marks)

- a) Draw the truth tables and logic symbols of the following logic gates.

- i. XOR gate [4 Marks]
- ii. NOT gate [3 Marks]
- iii. OR gate [3 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. Explain 3 types of errors that may occur during transmission over a network.

[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) Give 2 examples of common wireless systems that are used for communications [4
Marks]
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