

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

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

**COSC 00108: INTRODUCTION TO DIGITAL LOGIC AND DATA**

**STREAMS: CERT COMP SCI Y1S2**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 6 /07/ 2021**

**2.30 PM – 4.30 PM**

---

**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) List any **THREE** error detection techniques [3Marks]
- b) Explain the following transmission terminologies [8 marks]
  - i. Point-to-point configuration
  - ii. Multipoint configuration
  - iii. Guided medium
  - iv. Full Duplex
- c) Highlight **FOUR** components of data communication. [4Marks]
- d) Discuss **THREE** advantages of optical fiber over electrical cables [3Marks]

## COSC 00108

- e) Draw the truth tables of the following logic gates.
- i. XOR gate [3 Marks]
  - ii. NAND gate [3 Marks]
  - iii. NOT gate [3 Marks]
- f) Using a truth table show that,  $A+A'B = A+B$  [3 marks]

### SECTION B (Answer any TWO questions)

#### QUESTION TWO (20 Marks)

- a) Using a truth table show that  $AB = (A+B)(A+B')(A'+B)$  [6 Marks]
- b) The transmission mode decides how data is transmitted between two computers. Using a diagram, discuss the 2 modes of transmission. [8 marks]
- c) What is the difference between Combinational and Sequential circuits? [6 Marks]

#### QUESTION THREE (20 Marks)

- a. Draw the circuit diagram and excitation table for S-R flip – flop [6 Marks]
- b. Draw a digital circuit diagram of the following Boolean equation  $F= AB'+(AB)'$   
[8 marks]
- c. Discuss the THREE fundamental characteristics of data communication [6Marks]

#### QUESTION FOUR (20 Marks)

- a) Discuss the differences between synchronous and asynchronous data transmission modes.  
[6 Marks]
- b) With the aid of a diagram, explain parity checking error detection technique  
[8Marks]
- c) Flow control aims to ensure that the sending entity does not overwhelm the receiving entity. With the aid of a diagram, explain Stop-and-Wait Flow Control [6 Marks]

**QUESTION FIVE (20 Marks)**

- a) Discuss TWO properties shared by all types of flip-flops [4 Marks]
  - b) Discuss THREE types of errors that may occur during transmission over the network [6 Marks]
  - c) Explain TWO design factors of guided transmission medium [4 marks]
  - d) Discuss the operation of the following gates while illustrating their symbols and the truth table.
    - i. NOR gate [3 Marks]
    - ii. XOR gate [3 Marks]
-