CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF CERTIFICATE IN COMPUTER SCIENCE

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

STREAMS: CERT COMP SCI Y1S2 **TIME: 2 HOURS**

DAY/DATE: MONDAY 03/05/2021 **2.30 P.M – 4.30 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) 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. Unguided medium

c) Highlight FOUR components of data communication. [4Marks]

d) Give THREE examples of unguided transmission medium. [3Marks]

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) [10 Marks]

b) The transmission mode decides how data is transmitted between two computers. Using a diagram, discuss the 2 modes of transmission. [10 marks]

QUESTION THREE (20 Marks)

a. Explain Simplex, Half duplex and Full duplex [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. NOT gate [3 Marks]
