CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

CHUKA & EMBU

FIRST YEAR EXAMINATION FOR THE AWARD OF CERTIFICATE IN COMPUTER SCIENCE

COSC 00108: INTRODUCTION TO DIGITAL LOGIC AND DATA COMMUNICATIONS

STREAMS: CERT. COMP SCI (Y1S2)   **TIME: 2 HOURS**

DAY/DATE: THURSDAY 25/03/2021   **8.30 A.M. – 10.30 A.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) State any THREE design factors of guided transmission medium   [3 Marks]

b) What is the difference between Combinational and Sequential circuits?   [4 Marks]

c) Define the following terms

    i.   Transistors   [2 Marks]

    ii.   Diodes   [2 Marks]

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

e) Name THREE examples of guided transmission medium.   [3 Marks]

f) Draw the truth tables of the following logic gates.

   i.   XOR   [3 Marks]

   ii.   NOT   [2 Marks]

g) Draw the circuit diagram and truth table for S-R flip – flop.   [4 Marks]

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:

$$F=(\overline{\overline{A}\,B\overline{C}})(\overline{A}\,\overline{B}\,C)$$ [10 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   [8 Marks]

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

QUESTION FOUR (20 Marks)

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

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

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

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]