

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

MAIN/EMBU CAMPUS

EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0160: DATA COMMUNICATION AND COMPUTER NETWORKS

STREAMS: DIPLOMA COMP SCI Y1S2

TIME: 2 HOURS

DAY/DATE: THURSDAY 13/04/2023

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.

SECTION A {Attempt ALL questions in this section}

QUESTION ONE (30 MARKS)

- a. Differentiate between:
- Switch and hub [2 marks]
 - HTTP and HTTPS [2 marks]
 - Repeater and bridge [2 marks]
 - TCP and UDP [2 marks]
- b. Explain any **THREE** causes of network reliability issues. [6 marks]
- c. Using Manchester encoding scheme, encode the signal of the binary data 10101110. [4 marks]
- d. Explain the functions of the **TWO** sub-layers of data link layer. [4 marks]

- e. We need to connect 14 devices. What is the number of cable links required for a full mesh topology? [4 marks]
- f. Television channels are 12 MHz wide. How many bits/sec can be sent if 8-level digital signals are used? Assume a noiseless channel. [4 marks]

SECTION B (ANSWER ONLY TWO QUESTIONS)

QUESTION 2(20MARKS)

- a. Describe switching techniques used in data communication. [6 marks]
- b. Explain the difference between routing and flooding data transmission techniques used in mesh topology. [4 marks]
- c. Given the data-word 10100111 and the divisor 10111, show the generation of the CRC Code-word at the sender's side (using binary division). [6 marks]
- d. Highlight any FOUR different forms in which data may be represented. [4 marks]

QUESTION 3 (20MARKS)

- a. Discuss any FOUR benefits a hospital seeks to reap by utilizing a modern computer network. [8 marks]
- b. Explain any THREE similarities between bus topology and star topology. [6 marks].
- c. Define the terms Unicasting, Multicasting and Broadcasting as used in computer network [6 marks]

QUESTION 4 (20MARKS)

- a. A good network should be well secured. Discuss any THREE measures undertaken to protect data from unauthorised access or damage. [6 marks]
- b. Explain any TWO factors that may affect correct interpretation of signals. [4 marks]
- c. As a network architect, what factors would you consider when choosing a topology for a client? [10 marks]

QUESTION 5 (20MARKS)

- a. With the help of a diagram, differentiate between a hierarchical network and a flat network [6 marks]
- b. Briefly discuss Shannon capacity. [6 Marks]
- c. Discuss the significance of TCP/IP and its implementation in data networks. [8 marks]

