

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**Y1S2 EXAMINATION FOR THE AWARD OF DIPLOMA IN
COMPUTER SCIENCE**

COSC 0160: DATA COMMUNICATION AND COMPUTER NETWORKS

STREAMS: CERT COMP SCI.

TIME: 2 HOURS

CAMPUSES: MAIN& THARAKA

DAY/DATE.....

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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)

- Define the following characteristics that determine the effectiveness of any data communication system.
 - Jitter [2 marks]
 - Timeliness [2 marks]
- Distinguish between synchronous and asynchronous transmission [4 marks]
- State three advantages of wireless networks over guided networks [3 marks]
- What is the purpose of having a metal foil in shielded twisted pair (STP) cables?[2 marks]
- A telephone system with modem allows bandwidth of 3100 Hz. Using Nyquist theory calculate the maximum data rate. [4 marks]
- Differentiate between cross over and straight through data cables. [4 marks]
- Highlight five hardware devices required to set up a network [5 marks]
- Discuss the following concepts as used in computer networks.
 - Fault tolerance [2 marks]

- ii. Scalability [2 marks]

SECTION B {attempt any TWO questions from this section}

Question two (20 marks)

- b. Characters, numbers, special symbols and control characters are all represented using bits. Explain three common codes used to represent symbols. [6 marks]
- c. There are several ways to represent bits into electrical signals. Using diagrams discuss two broad classes of signal encoding. [12 marks]
- d. Write ISO and OSI in full. [2 marks]

Question three (20 marks)

- a. “Errors” can arise in a communication circuit from a variety of causes. Such errors may lead to degradation of the transmitted signal. Thus, the receiving end cannot correctly determine what was sent
 - i. List four conditions that can cause errors on a communication line [4 marks]
 - ii. Describe the error detection methods that can be put in place [8 marks]
 - iii. Describe error correction methods to maintain data integrity.[8 marks]

Question four (20 marks)

- a. Given IP address 192.168.10.44 with subnet mask 255.255.255.248 or /29.
 - i. Calculate the subnet address. [5 marks]
 - ii. Find the host range. [5 marks]
 - iii. Calculate the total number of subnets and hosts per subnet. [10 marks]

Question five (20 marks)

- a. Differentiate between intranet, extranet and internet [6 marks]
- b. A complete communicating system will have several layers, using a diagram discuss the OSI model. [14 marks]