



MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

BACHELOR OF EDUCATION (SCIENCE)

SIT 170: INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING

DATE: 20/4/2023

TIME: 8:30 – 10:30 AM

INSTRUCTIONS: ANSWER QUESTION ONE AND OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Assume that you have been contracted by a company to carry out networking in their business premises located in third floor of a seven-storey building.
- i) Highlight THREE reasons why full mesh topology could be preferred as compared to the other topologies? (3 marks)
 - ii) Identify the most suitable transmission media that you are likely to use and give TWO reasons for your choice. (3 marks)
 - iii) Name THREE network devices that you are likely to use to complete the network installation and how they will be utilized. (3 marks)
 - iv) Virtual-circuit networks could be created within the network to create a point-to-point connection. Highlight FOUR characteristics that make this kind of a network critical in networking. (4 marks)
- b) Biztech Telecom Ltd has recently established a Local Area Network which may later be connected to the Internet. Explain THREE reasons why you think the company took the initiative. (6 marks)
- c) Using appropriate illustrations, discuss the components of a data transmission system that model a data communication system. (6 marks)
- d) Highlight the role of the following media access protocols. (3 marks)
- i) Token bus
 - ii) Token ring
 - iii) Token passing

- e) Differentiate between broadband and baseband signaling (2 marks)

QUESTION TWO (20 MARKS)

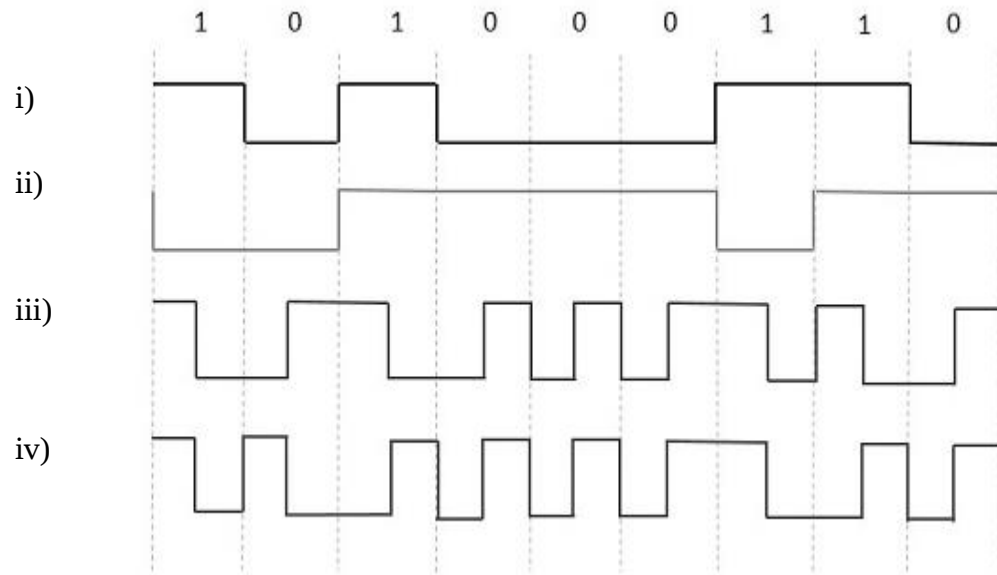
- a) Describe the following terms
- i) Encoding (1 mark)
 - ii) Routing (2 marks)
 - iii) Network traffic (2 marks)
 - iv) Network throughput (2 marks)
- b) Describe how the following broadcasting methods operates: (6 marks)
- i) Flooding
 - ii) Multi-destination routing
 - iii) Reverse path forwarding
- c) With the aid of a well labeled diagram, discuss the OSI model. (7 marks)

QUESTION THREE (20 MARKS)

- a) i) Define the term VoIP? (2 marks)
- ii) Highlight FOUR key benefits of VoIP technology. (4 marks)
- b) Carrier Sense Multiple Access (CSMA) is a network technology that allows for multiple-access of an Ethernet network. Discuss the two strategies used to deal with collisions in CSMA. (4 marks)
- c) Discuss the following LAN technologies. (4 marks)
- i) Ethernet
 - ii) 10BaseT
- d) Describe three retransmission strategies applied in a data communication channel. (6 marks)

QUESTION FOUR (20 MARKS)

- a) Identify each of the following data encoding techniques. (4 marks)



- b) Security is the greatest challenge of computer networks. Describe four security threats that exist in computer networks and identify the appropriate control measures for each threat. (8 marks)
- c) Discuss the architecture of TCP/IP reference model and explain its difference from the OSI model. (8 marks)

QUESTION FIVE (20 MARKS)

- a) Differentiate between the concepts in networking.
- i) Frequency Division Multiplexing and Time Division Multiplexing (4 marks)
 - ii) Packet switching and circuit switching (4 marks)
- b) Explain THREE application areas of computer networks. (6 marks)
- c) Explain the following network technologies (6 marks)
- i) ELAN
 - ii) LEC
 - iii) TCP/IP over ATM