



# MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SIT 201/ 306: DATA COMMUNICATIONS

DATE: 24/3/2021

TIME: 2.00-4.00 PM

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**INSTRUCTION:** Answer Question ONE and any other TWO Question

**QUESTION ONE (30 MARKS)**

- a) Briefly describe circuit switching. (4 marks)
- b) Explain how a packet-switched network works. (4 marks)
- c) Briefly discuss the main differences between TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). (8 marks)
- d) Discuss the main differences between Synchronous and Asynchronous Transmission, emphasizing signal timing issues. (4 marks)
- e) Explain the functions of the following networking components and devices (5 marks)
  - i. Hub
  - ii. Gateways
  - iii. Routers
  - iv. Switches
  - v. Modem
- f) Explain the reasons why packet switching is commonly used in data networks (3 marks)
- g) What are the application areas of message switching? (2 marks)

## **QUESTION TWO (20 MARKS)**

- a) Local Area Networks (LANs) require an 'access method' which determines how computers share a common transmission medium. Write down the two main approaches for controlling this sharing in wired networks. Briefly explain how each approach operates. (8 marks)
- b) Three physical topologies associated with LANs are: the bus, ring and star topologies. Describe each one, highlighting their strengths and weaknesses from a reliability point of view. (12 marks)

## **QUESTION THREE (20 MARKS)**

- a) Explain any two typical protocols in each of the following TCP/IP layers (8 marks)
- i. Transport Layer
  - ii. Network Layer
- b) Explain four advantages of IPV6 over IPV4 (4 marks)
- c) Name the advantages of fiber over twisted pair and coaxial cable (4 marks)
- d) Compare and contrast Half and Full Duplex communication (4 marks)

## **QUESTION FOUR (20 MARKS)**

- a) Define the following terms (4 marks)
- i. Delay
  - ii. Jitter
  - iii. Bandwidth
  - iv. Throughput
- b) Explain three services offered by the datalink layer (6 marks)
- c) Explain any two types of collision Domains in Ethernets (6 marks)
- d) Explain any virtual circuit switched communications works. (4 marks)

## **QUESTION FIVE (20 MARKS)**

- a) Explain the following types of cables used in networking highlighting their advantages
- i. Twisted pair cable
  - ii. Coaxil cable
  - iii. Fibre optics
- (8 marks)
- b) Distinguish peer to peer and client – server based as means of accessing network (4 marks)
- c) Explain any FOUR considerations when choosing an ISP. (8 marks)