



MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

SCO 105: DATA COMMUNICATION TECHNOLOGIES

DATE: 20/4/2023

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

This Paper consists of FIVE questions

Answer question ONE and other TWO questions in this paper

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Distinguish Baseband and Broadband technologies in data communication (2 marks)
- b) State THREE fundamental characteristics on which the effectiveness of data communication depends on. (3 marks)
- c) Differentiate between Asynchronous Transmission and Synchronous transmission. (3 marks)
- d) Using a diagram, illustrate components of data communication. (5 marks)
- e) Define a protocol and explain key components of a protocol (3 marks)
- f) Describe TWO types of Collision Domains in Ethernet. (4 marks)
- g) Explain the following Types of Switching techniques. (6 marks)
 - i. Circuit switching
 - ii. Packet switching
 - iii. Message switching
- h) Illustrate using a diagram, how Virtual Circuit Switched Communications Works (4 marks)

QUESTION TWO (20 MARKS)

- a) Using a well labeled diagram, Explain OSI model and responsibilities of each layer.
(7 marks)
- b) State THREE levels of addresses used in an internet employing the TCP/IP protocols
(3 marks)
- c) Distinguish between Transmission time and Propagation time as used in Flow Control protocols
(4 marks)
- d) Explain THREE reasons why we need fragmentation in stop and wait flow control.
(6 marks)

QUESTION THREE (20 MARKS)

- a) Define the following terms as used with Data communications
(6 marks)
 - i. Jitter
 - ii. Throughput
 - iii. Half Duplex mode
- b) Discuss the protocols used in each layer of the TCP/IP model
(6 marks)
- c) Explain FOUR advantages of IPV6 over IPV4
(4 marks)
- d) Explain the functions of the following networking components and devices
 - i. Hub
(2 marks)
 - ii. Gateways
(2 marks)

QUESTION FOUR (20 Marks)

- a) Describe FIVE routing protocols
(10 marks)
- b) Explain the following datalink flow controls:-
(6 marks)
 - i. Stop and Wait
 - ii. Fragmentation
 - iii. Sliding Window flow control
- c) Compare Ethernet and 10BaseT LAN technologies
(4 marks)

QUESTION FIVE (20 MARKS).

- a) Briefly discuss FOUR differences between TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). (6 marks)
- b) State FOUR cellular technologies as used with WAN technologies (4 marks)
- c) Explain the following types of cables used in networking highlighting their advantages (6marks)
 - i. Twisted pair cable
 - ii. Coaxil cable
 - iii. Fibre optics
- d) Distinguish peer to peer and client – server based as means of accessing network (4 marks)