



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 271:DATA COMMUNICATIONS

DATE: 9/8/2021

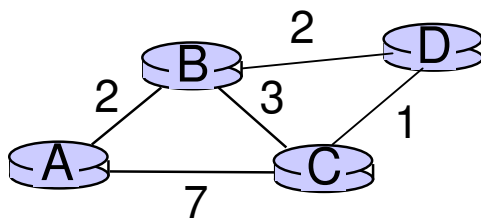
TIME: 8:30 – 10:30 AM

INSTRUCTION

Answer question **ONE** and other **Two** among the four selective questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain four protocols of an IP (6 marks)
- b) With the aid of a diagram, describe Ethernet frame format (6 marks)
- c) Using a well labelled diagram, explain the following types of data transmission
 - i) Parallel (3 marks)
 - ii) Serial (3 marks)
- d) You have been assigned the task of setting up a WLAN in Machakos University. State the function of three fundamental components of this network apart from switch and routers (6 marks)
- e) Consider the network below. Assume that the network implements the Distance Vector routing protocol. Generate the routing table of each node. (6 marks)



QUESTION TWO (20 MARKS)

- a) Describe token bucket mechanism for congestion control (8 marks)
- b) A network administrator would like to create VPN in a network. Explain three reasons for the his action (6 marks)
- c) Explain the two broad classes of signal encoding (6 marks)

QUESTION THREE (20 MARKS)

- a) Discuss three protocols of the application layer. (8 marks)
- b) Define the following data units (6 marks)
 - i) Protocol Control Information
 - ii) Service Data Units
 - iii) Protocol Data Unit
- c) A telecommunication company has been allocated a frequency band for transmission. Over the years, the numbers of customers have greatly increased thereby increasing traffic. Explain three techniques that could be deployed to allow simultaneous transmission of multiple signals across a single channel. (6 marks)

QUESTION FOUR (20 MARKS)

- a) Explain each of the following modulation techniques (4 marks)
 - i. AM
 - ii. FM
- b) Using a well labelled diagram, illustrate the communication interfaces in OSI model (10 marks)
- c) Using a diagram, explain the addressing in TCP/IP (6 marks)

QUESTION FIVE (20 MARKS)

- a) Compare a Virtual-Circuit and Datagram Networks (6 marks)
- b) Explain CRC (6 marks)
- c) A company has been given a network address 192.168.5.0/27, List all subnet addresses and their masks. (8 marks)