MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT170: DATA COMMUNICATIONS.

DATE: 14/12/2020   **TIME: 8.30-10.30 AM**

INSTRUCTIONS

Answer one question in section A and any two in section B

SECTION A

QUESTION ONE (30 MARKS) (COMPULSORY)

a)   List four fundamental characteristics of data communication.   (4 marks)

b)   Data communication is very critical in a business set up. It enables relay of information and facilitates transactions.

  i.   Discuss five components of data communication.   (5 marks)

  ii.   Communication happens in various modes, show one appropriate application for each of the three communications modes in existence.   (6 marks)

c)   There had been a lot of complains in Unga international company about the status of their network which had greatly affected their internal communications. Charles was engaged to evaluate the network. As a data communications expert, advice Charles on the three main aspects to guide him in the evaluation process.   (6 marks)

d)   A network is two or more devices connected through links. A link is a communications pathway that transfers data from one device to another. Discuss two possible types of connections.   (4 marks)

e)   Networks are created to interconnect devices within a defined zone. In this regard highlight five types of networks   (5 marks)

SECTION B:

QUESTION TWO (20 MARKS)

a)   Topology is the physical layout of computer devices in a network.

     i.   Name **four** types of network topologies.   (4 marks)

     ii.   With the aid of a diagram illustrate the layout of any two of the topologies stated in (a) above   (4 marks)

     iii.   List the most suitable application for each of the topologies listed in (a) above

            (4 marks)

b)   Differentiate between analog and digital communication   (4 marks)

c)   Differentiate between periodic and non-periodic signals as it applies in communication

         (4 marks)

QUESTION THREE (20 MARKS)

a)   Discuss the following characteristics of signals.   (8 marks)

     i.   Peak Amplitude

     ii.   Period and Frequency.

     iii.   Phase

     iv.   Wavelength

b)   Discuss three signal transmission impairments   (6 marks)

c)   Explain the following expression in as it applies to signal and noise relationship:

     SNRdB = l0logl0 SNR   (4 marks)

d)   Draw a well labeled sine wave   (2 marks)

QUESTION FOUR (20 MARKS)

a)   Define multiplexing   (1 mark)

b)   State the importance of multiplexing in the current world.   (1 mark)

c)   Explain the following terms as used in multiplexing   (9 marks)

     i.   Frequency-Division Multiplexing

     ii.   Wavelength-Division Multiplexing

     iii.   Time-Division Multiplexing

d)   List two types of fiber optic cables.   (2 marks)

e)   Highlight four advantages of using fiber optic cables for communication.   (4 marks)

f)   There has been some sluggishness in utilizing fiber optic cables in data communication. Explain the possible reasons for the slow adoption   (3 marks)

QUESTION FIVE (20 MARKS)

a)   Differentiate the following   (10 marks)

      i.   Radio wave and micro wave.

      ii.   Circuit switched and packet switched network

      iii.   Datagram and virtual circuit networks

      iv.   Parallel and serial transmission.

      v.   Synchronous and asynchronous transmission

b)   Describe the role of each layer in the OSI model as listed below.   (7 marks)

      i.   Physical Layer

      ii.   Data Link Layer

      iii.   Network Layer

      iv.   Transport Layer

      v.   Session Layer

      vi.   Presentation Layer

      vii.   Application Layer

c)   State three devices used in setting up a Local Area Network (LAN)   (3 marks)