(Knowledge for Development)
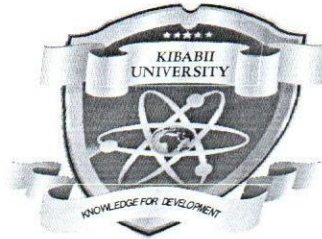
KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR TWO SEMESTER TWO

FOR THE DEGREE OF
COMPUTER SCIENCE

COURSE CODE   :   CSC 223

COURSE TITLE   :   DATA COMMUNICATION

DATE: 11/02/2021   TIME: 2.00 P.M – 4.00 P.M

INSTRUCTIONS:

ANSWER QUESTIONS ONE and ANY OTHER TWO

QUESTION ONE [COMPULSORY] [30 MARKS]

a) Differentiate the following terminologies as used in computer networks

   (i) Data and Information   [2 marks]

   (ii) De facto and De jure   [2 marks]

b) Distinguish between a perfect channel and a Noisy channel.   [2 marks]

c) In computer networks, communication occurs between entities in different systems. An entity is anything capable of sending or receiving information. However, two entities cannot simply send bit streams to each other and expect to be understood. For communication to occur, the entities must agree on a protocol. Identify and explain the *THREE* key elements of a protocol.

                                                                  [6 marks]

d) Discuss the *FIVE* main components of a data communication system.   [10 marks]

e) Explain the factors that determine effective data communication system.   [8 marks]

QUESTION TWO [20 MARKS]

a) Differentiate between physical topology and logical topology.   [2 marks]

b) Computer networks has been and is a key driver in the development of technology and innovation for internal processes of any organization. Identify and discuss any *FOUR* advantages of Networks today.   [8 marks]

c) Describe the following types of topologies highlighting the advantages and disadvantages of each.

   i.   Linear bus   [3 marks]

   ii.   Tree or expanded star   [3 marks]

d) Outline any *TWO* forms in which data can be represented, giving one example for each.   [4 marks]

QUESTION THREE [20 MARKS]

a)   i. What do you understand by signal encoding.   [2 marks]

      ii. Outline any two possible encodings that can be done on a signal.   [2 marks]

b) What is the main difference between multiplexing and channelization? [3 marks]

c) Discuss the *THREE* channelization protocols. [9 marks]

d) Explain *THREE* switching techniques that may be used in data communication. [6 marks]

QUESTION FOUR [20 MARKS]

a) Distinguish between the following terms as used in data communication:

    i. Bandwidth and Jitter [2 marks]

    ii. Bit rate and Baud rate [2 marks]

b) i. What do you understand by the term "signal"? [1 mark]

    ii. Give two examples of quantities that are used digital information signals. [2 marks]

    iii. Data and signals are key parameters in transmission. However, transmission media may not be perfect hence signal impairment. Identify and explain Three (3) causes of media transmission impairment. [6 marks]

c) i. Describe the ways in which digital signals are transmitted. [4 marks]

    ii. An analog signal has a lower frequency of 10 Hz and a higher frequency of 150 Hz. Calculate the bandwidth of this signal. [3 marks]

QUESTION FIVE [20 MARKS]

a) Describe the following layers of the OSI model as used in data communication.

    i. Physical layer [4 marks]

    ii. Data link layer [4 marks]

b) i. Out the layers in the TCP/IP Reference model [4 marks]

    ii. Explain any two addressing types of the TCP/IP protocol suit. [4 marks]

c) The table below shows information on the number of networks and host in each class. Complete the table giving the missing information. [4 marks]

Class	Range of host addresses	Application
A	1.0.0 to 127	
	192.0 to 223	
	240.0 to 255	Reserved