GARISSA UNIVERSITY

UNIVERSITY EXAMINATION **2017/2018** ACADEMIC YEAR **TWO SECOND** SEMESTER EXAMINATION

SCHOOL OF COMPUTER AND INFORMATION SCIENCE

FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE

COURSE CODE: INS 210

COURSE TITLE: DATA COMMUNICATION

EXAMINATION DURATION: 3 HOURS

DATE: 19/04/18   **TIME: 09.00-12.00 PM**

INSTRUCTION TO CANDIDATES

- **The examination has SIX (6) questions**

- **Question ONE (1) is COMPULSORY**

- **Choose any other THREE (3) questions from the remaining FIVE (5) questions**

- **Use sketch diagrams to illustrate your answer whenever necessary**

- **Do not carry mobile phones or any other written materials in examination room**

- **Do not write on this paper**

This paper consists of THREE (3) printed pages   *please turn over*

QUESTION ONE (COMPULSORY)

(a) Explain four benefits of computer networks to an organization **[4 marks]**

(b) Explain five advantages of digital transmission over analogue transmission **[5 marks]**

(c) Differentiate between the following network devices
  i.   Switch and hub **[2 marks]**
  ii. Firewall and IDS **[2 marks]**
  iii. Router and Brouter **[2 marks]**

(d) An airline seat reservation system is being designed in a new airport. One problem that existed in the old location is that some of fast computers on the network could monopolize the bandwidth, causing agents with slower computer to miss seating opportunities

(e) Recommend and explain network topology could you use that creates a far environment in which all computer have equal access to the available bandwidth? **[4 marks]**

(f) Using well labeled diagrams, explain the following multiplexing techniques
  i.   Time Division Multiplexing **[3 marks]**
  ii. Frequency Division Multiplexing **[3 marks]**

QUESTION TWO

(a) Explain with the help of schematic diagram the main elements of digital data communication system **[5 marks]**

(b) A manufacturing firm wants to connect two offices which are 150M apart. The media which be laid alongside heavy electrical machinery and also there is a problem of RFI. You have been approached to consult on type of media to be used and recommend the type of LAN to be implemented. Justify your answer(s). **[5 marks]**

(c) Explain using well labeled illustration any three security components **[5 marks]**

QUESTION THREE

(a) Jane is a lecturer at Garissa University and intends to buy a book from one of online bookstore for her research. Explain the logical data communication processes that will occur from the time She places an order online to the time it is received by the bookstore if the network uses TCP/IP protocol model **[9 marks]**

(b) Using a diagram show how the data bits 010011 will be encoded to data signals if the encoding technique is
  i.   Unipolar NRZ **[2 marks]**
  ii. Bi phase Manchester **[2 marks]**
  iii. Differential Manchester **[2 marks]**

QUESTION FOUR

(a) Explain five key tasks that must be performed by data communications system **[5 marks]**

(b) A switch is a device that allows a LAN to be segmented and operate under the same protocol. Compare three methods used by switches to deal with data and recommend the best method giving reason(s). **[4 marks]**

(c) Transmission of information in any network involves end-to-end addressing and sometimes local addressing. The table below shows the types of networks and the addressing mechanism used in each of them.

Network	Setup	Data Transfer	Teardown
Circuit-switched	End-to-end		End-to-end
Datagram		End-to-end	
Virtual circuit	End-to end	Local	End-to-end

Using the table above to answers the following questions

    i.   Why does a circuit-switched network need end-to-end addressing during the setup and teardown phases? **[2 marks]**

   ii.   Why are no addresses needed during the data transfer phase for this type of network **[2 marks]**

  iii.   Why does a virtual-circuit network need addresses during all three phases? **[2 marks]**

QUESTION FIVE

(a) ABC enterprise currently employs eight people but plans to hire 10 more in the next four months. Users will work on multiple projects but one at time. Project manager should have access to all project files. You are instructed to setup the network to make it easy to manage and backup files. What type of LAN will you chose and why? **[5 marks]**

(b) Using a well labelled diagram, explain how fiber optic cable transmits data. **[5 marks]**

(c) There are three main types of network topologies namely; star, ring and bus. As a network administrator, you have been asked to produce a briefing document that discusses each topology in terms of cabling cost, fault tolerance, data redundancy and performance as the number of nodes increases. **[5 marks]**

QUESTION SIX

(a) Explain three factors that necessitate data transmission and networks capacity requirements in an organization **[3 marks]**

(b) Discuss the following media access techniques

    i.   FDDI **[4 marks]**

   ii.   Demand priority **[4 marks]**

  iii.   Contentious technique **[4 marks]**