CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE APPLIED COMPUTER SCIENCE

ACSC 261: DATA COMMUNICATION AND NETWORKS

STREAMS: **TIME: 2 HOURS**

DAY/DATE: THURSDAY 5/12/2019   **2.30 P.M – 4.30 P.M**

INSTRUCTIONS

Attempt question ONE (Section A) and any other TWO from SECTION B

- **Marks are awarded for clear and concise answers**

- **ONLY the first THREE Questions attempted will be marked (Question one inclusive)**

SECTION A-COMPULSORY

QUESTION ONE (30 MARKS)

a) Differentiate the following terms

    i. Intranet based VPN and Extranet based VPN   (2 marks)

    ii. Broadband and baseband   (2 marks)

    iii. Unshielded twisted pair and shielded twisted pair   (2 marks)

    iv. Parallel transmission and serial transmission   (2marks)

    v. LAN and WAN   (2 marks)

b) Differentiate between static NAT and dynamic NAT   (4 marks)

c) With an aid of a diagram explain the operation of a port address translation protocol

    (6 marks)

d) With an aid of a diagram differentiate between simple mail transfer protocol (SMTP) and the post office protocol (POP) (6 marks)

e) Briefly explain the mechanism that Ethernet applies in detection of MAC frame errors.

(4 Marks)

QUESTION TWO (20 MARKS)

a) With an aid of a diagram, explain the OSI reference model (14 marks)

b) Compare and contrast the channels using electrical cables and those using optical cables

(6marks)

QUESTION THREE (20 MARKS)

a) Assume that you are an employee in the department of computer science.

i. Make out a purchase order requesting that a newly set up training lab with 40 computers be joined to the network (3 marks)

ii. Fully explain on your purchase order why it is necessary to join this new lab to the network (5 marks)

b) One way of separating a network is by using routers .The other is creating VLANs. Give THREE benefits of creating several LANs to separate hosts into networks (3 marks)

c) With the use of diagrams explain the three types of multiplexing techniques

(9 marks)

QUESTION FOUR (20 MARKS)

a) Explain the following WAN switching techniques (6 marks)

i. Packet switching

ii. Circuit switching

b) Explain three types of errors that occur in data transmission between the transmitter and the receiver (6 marks)

c) Explain three features that can be used to measure the effectiveness of data communication (6 marks)

d) State two types of fiber optic cables (2 marks)

QUESTION FIVE (20 MARKS)

a) Briefly describe the operation of the following network standards/technologies. For each of the standards, show the frame/packet structure./architecture

   i.   Ethernet (5 marks)

   ii. FDDI (5 marks)

b) Give ONE differences between a router and a bridge. (1 mark)

c) Given the following network address 172.30.11.15/26 calculate the following;

   i.   Network ID

        (3 marks)

   ii. Broadcast address

        (3 marks)

   iii. First and last valid IP on the sub network

        (3 marks)