B2.4-R4: DATA COMMUNICATION & NETWORK TECHNOLOGIES

NOTE:

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.

2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.

3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS **TOTAL MARKS: 100**

(PART ONE – 40; PART TWO – 60)

PART ONE
(Answer all the questions)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1x10)

1.1 A protocol is a set of rules governing a time sequence of events that must take place
A) between an interface
B) between modems
C) between peers
D) across an interface

1.2 Which of the following communications lines is best suited for interactive processing of applications?
A) full duplex lines
B) narrow band channel
C) simplex lines
D) mixed band channels

1.3 Which of the following is true about ATM and Packet Switching?
A) Both ATM and Packet Switching have relatively small size cells
B) Packet Switching has no windowing while ATM has
C) Both have fixed length cells
D) ATM has no error detection on data while Packet Switching has

1.4 The event that will not cause recalculation of the distance vector is
A) discovery of a longer path to an existing destination
B) discovery of a long path to a new destination
C) discovery that a link to a neighbor has gone down
D) to receive a shorter path to an existing destination

1.5 BOOTP is a possible solution to the problem where
A) Address space is limited
B) host IP address must be changed if he moves from one network to another
C) all hosts addresses must be changed if class B networks grow too large
D) all hosts addresses must be changed at least once a year

1.6 SNMP is not used to
A) report extraordinary events
B) retrieve specific management information
C) transfer mail through the network
D) manipulate management information

1.7 Which of the following is not a routing strategy?
A) Fixed routing
B) Adaptive routing
C) Random routing
D) Float routing

1.8 hWhich Protocol is a mechanism used by hosts and gateways to send notification of datagram problems back to the sender?
A) ICMP
B) IGMP
C) HDLP
D) POP

1.9 In the field of Communication, Data rate depends on factors like
A) The bandwidth available
B) The level of the signals used
C) The quality of the channel
D) All of the above

1.10 We call bridges that create and update their own routing tables
A) Route learning
B) Address learning
C) Transparent bridges
D) Brouters

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "tear-off" sheet attached to the question paper, following instructions therein. (1x10)

2.1 HDLC is a standard synchronous communication protocol.
2.2 A protocol data unit (PDU) is exchanged between the same layers in two separate protocol stacks. It comprises the PDU passed from the layer immediately above and its own protocol control information.
2.3 Telnet establishes a TCP connection to port 125, on which the POP3 server listens.
2.4 The presentation layer ensures interoperability between communicating devices through transformation of data into a mutually agreed upon format.
2.5 In statistical TDM, slots are dynamically allocated to improve bandwidth efficiency.
2.6 Membership in a VLAN can be based on port numbers, MAC addresses, IP addresses, multicast addresses, or a combination of these features.
2.7 To distinguish between different streams, SCTP uses the sequence identifier (SI).
2.8 The minimum Hamming distance is the maximum Hamming distance between all possible pairs in a set of words.
2.9 One of the advantages of a hub is the separation of the collision domain.
2.10 A bridge does not change the physical (MAC) addresses in a frame.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1x10)

X		Y	
3.1	An application protocol for accessing and maintaining distributed directory information services over an IP network	**A.**	chips.
3.2	Listening to port 25 is an e-mail daemon	**B.**	classless addressing.
3.3	A user-to-network interface (UNI) is the interface between a user and	**C.**	POP
3.4	Address aggregation simplifies the forwarding process in	**D.**	the header.
3.5	In SCTP, each data chunk is numbered using a	**E.**	transmission sequence number (TSN).
3.6	In the token-passing method, the stations in a network are organized in	**F.**	an ATM switch.
3.7	GSM uses two bands for	**G.**	flooding.
3.8	In IPv4 the total length field defines the total length of the datagram including	**H.**	duplex communication.
3.9	Building a routing table in Link State Routing (LSR) and dissemination of LSPs to every other router is called	**I.**	X.509
3.10	CDMA is based on coding theory and uses sequences of numbers called	**J.**	LDAP
		K.	active directory
		L.	a logical ring.
		M.	SMTP

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1x10)

A.	bit stuffing	**B.**	SONET	**C.**	an IP address
D.	Byte stuffing	**E.**	binary exponential back-off	**F.**	full-duplex
G.	Piggybacking	**H.**	a URL	**I.**	frame bursting
J.	Port addres	**K.**	Supernetting	**L.**	IFS (Inter frame space)
M.	WWW				

4.1 Each page is assigned _____ that effectively serves as the page's worldwide name.

4.2 In _____, if a 0 and five consecutive 1 bits are encountered, an extra 0 is added.

4.3 In CSMA/CA, the _____ can also be used to define the priority of a station or a frame.

4.4 _____ combines several networks into one large one.

4.5 TCP provides process-to-process, _____, and connection-oriented service.

4.6 In _____ method, for each retransmission, a multiplier in the range 0 to 2^{r-1} is randomly chosen and multiplied by Tp (maximum propagation time) or Tfr (the average time required to send out a frame) to find Tb (back-off time).

4.7 Bursting Carrier extension is very inefficient if there is a series of short frames to send; each frame carries redundant data. To improve efficiency, _____ was proposed.

4.8 _____ defines four layers: path, line, section, and photonic.

4.9 The DHCP server issues a lease for _____ to a client for a specific time.

4.10 A technique called _____ is used to improve the efficiency of the bidirectional protocols.

PART TWO

(Answer any **FOUR** questions)

5.

a) Explain the responsibilities of the session layer and presentation layer in OSI reference model.

b) Data can be corrupted during transmission. Explain the types of error which can be generated by corruption of data at data link layer. How CRC can be used to detect these kinds of error?

c) Explain Distance Vector Routing. Describe how split horizon technique is used to remove the problem of count infinity.

(5+5+5)

6.

a) Write a short note on Network Virtual Terminal.

b) List the drawback of X.25. In response to the X.25 drawbacks, Frame Relay was designed. Write the feature of Frame Relay through which it overcomes it.

c) What is Fragmentation? Explain the field related to Fragmentation in IPv4 packet format.

(3+6+6)

7.

a) Congestion control refers to techniques and mechanisms that can prevent congestion, before it happens. What are Open-Loop Congestion Control and Closed-Loop Congestion Control?

b) The electromagnetic spectrum defined as radio waves and microwaves is divided into eight ranges, called bands, each regulated by government authorities. List various band with range, propagation and its application.

c) What is subnetting? Write down the number of blocks and block size in classful IPv4 addressing.

(4+6+5)

8.

a) What is the difference between public key and private key security algorithm?

b) Explain the different addresses used in virtual circuit networks.

c) What is Transmission Impairment? Explain three causes of it.

(4+4+7)

9. Write a short note on following:

a) Selective Repeat Automatic Repeat Request protocol

b) Loop Problem in Transparent bridges

c) BOOTP

(3x5)