B2.4-R3: DATA COMMUNICATION AND COMPUTER NETWORKS

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. (1 x 10)

1.1 A switching technique where a dedicated path is established between the end systems for transport of data units

A) Message switching
B) Packet switching
C) Circuit switching
D) Virtual circuit switching

1.2 If the average Bit Error Rate (BER) is $1x10^5$ then the probability of having single bit error is

A) .00001
B) .99999
C) 1.00001
D) .00005

1.3 Bridges work at OSI model

A) Layer 1
B) Layer 2
C) Layer 3
D) Layer 4

1.4 SNMP uses the following series to manage the network

A) Gets and Puts
B) Send and Receive
C) Request and Reply
D) Client and server

1.5 The function of ARP is to determine
A) Ethernet address
B) IP address
C) Subnet address
D) Host address

1.6 SONET commonly transmits data at speeds
A) Between 155 Mbps and 2.5 Gbps
B) Less than 155 Mbps
C) Between 2.5 Gbps and 6 Gbps
D) More than 6 Gbps

1.7 NFS allows
A) A system to share directories and files with others in a computer system
B) A system to share directories and files with others over a network
C) A system to share files with others over a network
D) A system to share directories with others in a computer system

1.8 Available modems have a maximum speed of
A) 64 Kbps
B) 48 Kbps
C) 100 Mbps
D) 56 Kbps

1.9 ATM networking technology can be used in
A) LAN only
B) WAN only
C) Both LAN and WAN
D) None of the above

1.10 The encryption in which each vulnerable communications link is equipped on both ends with an encryption device
A) End-to-end encryption
B) Triple encryption
C) Multiple encryptions
D) Link encryption

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. (1 x 10)

2.1 IPv4 has 128 bits and IPv6 has 32 bits.
2.2 Rijndael allows for block lengths of 128, 192, or 256 bits, whereas AES allows only a block length of 128 bits.
2.3 FSK is a technique that can be considered as a frequency modulated binary PCM.
2.4 For fixed routing, a single, permanent route is configured for each source destination pair of nodes in the network.
2.5 GSM networks employ FDMA only.
2.6 TCP uses a credit-based flow and error control technique that is somewhat different from the sliding-window flow control found in X.25 and HDLC.
2.7 The number of hops is one less than the number of nodes visited.
2.8 A bridged network allows communication between two computers on one segment to occur simultaneously as communication between two computers on another segment.
2.9 ADSL provides a lower bit rate downstream than upstream.
2.10 DNS uses UDP instead of TCP.

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. (1 x 10)

X		Y	
3.1	Low speed data transmission on telephone transmission systems	**A.**	36,000 kilometers
3.2	Ethernet	**B.**	01111110 binary
3.3	MAC (Ethernet) address to IP address	**C.**	MD5
3.4	Token passing protocol	**D.**	FDDI
3.5	ISDN	**E.**	Base station
3.6	Checksum algorithm	**F.**	RARP
3.7	Cellular network	**G.**	B Channel
3.8	HDLC frame	**H.**	ARP
3.9	Geo-synchronous satellite	**I.**	FSK
3.10	WiFi	**J.**	CSMA/CD
		K	IEEE 802.11
		L	IEEE 802.9

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. (1 x 10)

A.	Fundamental frequency	**B.**	512 bytes	**C.**	Attenuation
D.	D channel	**E.**	IEEE 802.5	**F.**	21
G.	Block cipher	**H.**	Stream cipher	**I.**	Blue tooth
J.	19	**K.**	Microwave	**L.**	B Channel
M.	IEEE 802.3	**N.**	Ethernet	**O.**	Link-state
P.	64 Bytes	**Q.**	Flooding	**R.**	Protocol

4.1 Cipher that encrypts a digital data stream one bit or one byte at a time is called _____.

4.2 A(n) _____ is the set of rules or conventions governing the way in which two entities cooperate to exchange data.

4.3 The _____ is the lowest frequency component in the Fourier representation of a periodic quantity.

4.4 TFTP can transfer a maximum of _____ per round trip.

4.5 With _____, a packet is forwarded to all other switches so that eventually all routes between source and destinations are traversed.

4.6 FTP defaults to listen on port _____ for incoming connections from FTP clients and on port 20 for data.

4.7 Point-to-point _____ transmission has the advantage of not requiring access to all contiguous land along the path of the system, because microwave systems are line-of-sight media.

4.8 _____ is the gradual weakening of a signal over distance.

4.9 Token ring LAN speeds of 4 MBps and 16 MBps have been standardized by the _____ working group.

4.10 ISDN's _____ channel uses a slightly modified version of HDLC**.**

PART TWO

(Answer **ANY FOUR** questions)

5.

a) What are the two most popular protocols that are used in Internet?

b) What is CDMA and what is spread spectrum? What is the relation between the two?

c) Briefly explain ICMP. How is an ICMP message datagram constructed?

(5+5+5)

6.

a) What is the difference between?

i) Analog signal and digital signal

ii) Guided media and unguided media

b) Compare FDM with TDM. How TDM is different from synchronous TDM.

c) What is CRC? Discuss whether a large noise burst can create an error in a packet?

(5+5+5)

7.

a) What are the advantages and disadvantages of using a twisted pair? What are its two forms?

b) Describe the advantages of a data field size of 48 octets in ATM. Then with respect to ATM discuss the following:
Real-time variable bit rate, Available bit rate.

c) Explain, why frame relay is considered simpler than X.25.

(5+5+5)

8.

a) Why is an OSI model used? Mention at least four functions of data link layer.

b) Explain with the help of an example the difference between Bellman-Ford algorithm and Dijkstra's algorithm for routing.

c) Discuss the role of broadcast control channel, dedicated control channel and common control channel in GSM.

(5+5+5)

9. Write Short notes on (**any Three**):

a) Optical fiber

b) Network layer

c) Choke packets and congestion

d) VSAT

(3x5)