B2.4-R3: DATA COMMUNICATION AND NETWORK

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   Circuits board or card that is installed in a computer so that it can be connected to a network:
A)   Modem
B)   NIC
C)   Repeater
D)   Router

1.2   Digital Channel means that the channel
A)   is digitized
B)   is carrying digital data
C)   accepts digital modulation techniques
D)   None of the above

1.3   Flow control in OSI model is done by
A)   Data link layer
B)   Network layer
C)   Transport layer
D)   Both data link and transport layer

1.4   Suppose you want to send an e-mail note to someone on the Internet. Which of these do you NOT need?
A)   browser
B)   Internet service provider
C)   at sign
D)   address

1.5 In TCP, the path
A) up to destination is allocated before the transmission of message begins
B) up to next intermediate node is allocated before the transmission of message begins
C) to be followed depends on the length of message
D) none of the above

1.6 IP address in the B class is?
A) 125.123.123.2
B) 191.023.21.54
C) 192.128.32.56
D) 10.14.12.34

1.7 Which of the following to keep track of the individual units of data (called packets) that a message is divided into for efficient routing through the Internet.
A) Address Resolution Protocol (ARP)
B) Internet Protocol (IP)
C) Hypertext Transfer Protocol (HTTP)
D) Transmission Control Protocol/Internet Protocol (TCP/IP)

1.8 How much channel throughput of slotted ALOHA will be in comparison to pure ALOHA.
A) Same
B) Double
C) Three times
D) None of these

1.9 For separating channels in FDM, it is necessary to use
A) time slots
B) band pass filters
C) differentiation
D) none of the above

1.10 Light is confined within the core of a simple optical fiber by
A) refraction
B) total internal reflection at the outer edge of the cladding
C) total internal reflection at the core cladding boundary
D) reflection from the fiber's plastic coating

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 Coaxial cable provides data rates over 10 Mbps and frequencies upto 400 MHz.
2.2 Synchronous transmission is known as start/stop transmission.
2.3 UTP Category 3 can be used in Fast Ethernet networks.
2.4 FDDI specifies protocol for network layer.
2.5 CRC error detection technique is used in TCP.
2.6 Circuit switching is generally more efficient than packet switching for non-voice communication.
2.7 The functional grouping and reference points of B-ISDN are the same for regular ISDN.
2.8 QPSK uses the phase shift of multiple of 60 degree.
2.9 Data rate supported by LED is generally higher than semiconductor lasers in fiber optic communication.
2.10 10Base5 and Thick Net are the same term used for a type of LAN implementation.

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	Sharing of communication channel	**A.**	Modem
3.2	Virtual Terminal Protocol	**B.**	Multi drop line
3.3	Contention and collision are problems in	**C.**	Ring topology
3.4	Return to zero	**D.**	Quantization
3.5	Converts a series of binary voltage pulse into analog signal by encoding the digital data onto a carrier frequency	**E.**	BNC
3.6	Each router periodically shares its own knowledge about the network with its immediate neighbor routers	**F.**	Distance vector routing
3.7	Every router has its own unique routing table	**G.**	Application layer
3.8	The message units exchanged between two protocol entities	**H.**	Link state routing
3.9	Surface propagation is related with	**I.**	Bus topology
3.10	Router operates under the layer in OSI reference model	**J.**	Manchester coding
		K.	Transport layer
		L.	Network layer
		M.	Binary coding
		N.	Very Large Frequency

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.	Twisted pair	B.	Presentation layer	C.	Packet Switching
D.	Piggy backing	E.	Delay	F.	Data encapsulation
G.	Application layer	H.	Star	I.	Circuit Switching
J.	RJ 45	K.	TCP	L.	Data link
M.	Direct connection	N.	Full Duplex	O.	32 Bytes
P.	BNC				

4.1   Digital signals can also be transmitted in _____ mode.

4.2   _____ circuits are appropriate circuits for transmission of voice and real-time data.

4.3   FTP, SMTP and Telnet are standard protocol for the _____.

4.4   The main disadvantage of satellite communication is its huge _____ in propagation.

4.5   _____ is a technique used to recover from occasional frame loss problem.

4.6   The LAP-B protocol is an example of the standard for the _____ layer of the OSI reference model.

4.7   Due to less information capacity the coaxial cable has lower degree of attenuation at high frequencies than _____ cable.

4.8   _____ switching technique is also known as store-and-forward.

4.9   Connections to the thin Ethernet cable are generally made using _____ connectors.

4.10   The minimum frame size in 802.3 LAN is _____.

PART TWO
(Answer any **FOUR** questions)

5.

a) On a transmission channel, 700 character messages is transmitted in synchronous and asynchronous mode using ASCII 7 bit code. For transmission purpose in synchronous data stream, there are two synchronous characters and a single error detection character is added. In the case of asynchronous data transmission there is one start bit, one stop bit and a single error detection character is added. Calculate the efficiency of transmission in the above two types of transmission modes.

b) Explain three services that a data link protocol provides to sending and receiving devices to help them coordinate and communicate.

(8+7)

6.

a) Define forwarding function. Explain its significance with the help of suitable example.

b) What are the different classes of addresses used in IPv4? List their ranges in dotted decimal notation.

c) Why is frequency modulation superior to amplitude modulation?

d) Explain the functioning of cellular radio.

(6+3+3+3)

7.

a) What basic functions does a communication satellite perform? Give a good reason why uplink and downlink frequencies are not same. Why earth dish antennas are generally parabolic in shape?

b) FSK is a good choice for low speed modems. Explain why it is not suitable for high speed modems?

c) What is distributed routing? Compare it with hierarchial routing.

(6+5+4)

8.

a) What are the five layers of the TCP/IP model? Briefly describe the functionality of each layer.

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

(10+5)

9.

a) What is the function of a null modem? Show the internal communications used within a null modem and explains the significance of each connection.

b) What is the purpose of cladding in an optical fiber? Discuss its density with respect to the core.

c) Mention any three requirements for reliable data transfer?

(8+4+3)