B2.4-R4: DATA COMMUNICATIONS AND 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 **OMR ANSWER SHEET** only, supplied with 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 "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

1.1 Performance of a network can be measured by considering _____.
A) transit time
B) response time
C) both A) and B)
C) none of the above

1.2 The term _____ refers to the way in which a network is laid out physically.
A) physical topology
B) conceptual structure
C) network design
D) none of the above

1.3 The main disadvantage of the ring topology of network is _____.
A) unidirectional traffic
B) dedicated point to point connections
C) both A) and B)
D) none of the above

1.4 Standards that are not approved by an organizing body, but have been adapted as standards through widespread use are known as _____.
A) default
B) de facto
C) de jure
D) none of the above

1.5 A _____ is a set of rules that govern data communication; however, data communication can be made without it.
A) protocol
B) standards
C) packages
D) none of the above

1.6 Wireless LANs use _____.
A) management frames
B) control frames
C) data frames
D) all of the above

1.7 _____ listens to a portion of a spectrum, amplifies the incoming signal, and then rebroadcasts it at different frequency.

A) Transponder
B) Repeater
C) Gateway
D) None of the above

1.8 Membership of a virtual LAN is based on _____.

A) port number
B) topology used
C) network size
D) none of the above

1.9 Which of the following networks requires that all channels in a message transmission path be of the same speed?

A) packet-switched network
B) circuit-switched network
C) message-switched network
D) None of the above

1.10 The qualifier differential to PSK means that _____.

A) it uses phase shifts of multiple of 90^0
B) it uses phase shift of 45^0
C) phase shift is with reference to the previous bit transmitted
D) none of the above

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

2.1 All the networks use distributed processing.

2.2 MAN is the best choice when customers need both – (i) high speed connectivity and (ii) coverage area is within a town.

2.3 Frequency and period of a digital signal are inverse of each other.

2.4 Line coding is a process that converts digital signal to digital data.

2.5 The network allocation vector is a timer used for error checking.

2.6 The basic unit of a Bluetooth network is called a piconet.

2.7 A unicast address defines a single computer.

2.8 IPv6 Header includes a checksum header.

2.9 Post office protocols while mailing via Internet are used for pulling mails from different servers.

2.10 Virtual private networks need not use real private WANs.

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 "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

X		Y	
3.1	ARPANET	**A.**	CSMA/CA
3.2	Cerf and Kahn	**B.**	Internet service provider
3.3	ISP	**C.**	Transport layer
3.4	Hop to hop delivery	**D.**	IP address
3.5	Process to process delivery	**E.**	Data link layer
3.6	Address which defines a host uniquely	**F.**	One bit signaling element
3.7	Unguided media	**G.**	TCP
3.8	Avoids collision on wireless networks	**H.**	Advanced mobile phone system
3.9	Cellular telephony area	**I.**	wireless communication
3.10	NRZ-L and FSK	**J.**	Internet
		K.	CSMA/CD
		L.	Cryptography
		M.	Secret key

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 "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

A.	Secret	**B.**	Same	**C.**	Burst error
D.	10 Base 5	**E.**	White	**F.**	Guided media
G.	WAN	**H.**	CSMA	**I.**	Unguided media
J.	PPP – Point to Point Protocol	**K.**	Single path	**L.**	A semi column
M.	Firewall				

4.1 Twisted pair cable, co-axial cable and fiber optic cables are examples of _____.

4.2 _____ means two or more bits in the data unit have changed from 0 to 1 or 1 to 0.

4.3 _____ defines format of the frame to be exchanged between devices.

4.4 _____ noise is not a natural noise.

4.5 To minimize the chance of collision of frames and hence to increase performance the _____ method is used.

4.6 A leased line in commonly used for _____ links.

4.7 The downlink and uplink channels of a satellite must not be _____.

4.8 _____ is a component which blocks the network traffic based on set of rules for security.

4.9 _____ is a thick Ethernet.

4.10 Symmetric key in cryptography is also known as _____ key.

PART TWO

(Attempt any **FOUR** questions)

5.

a) Explain in brief about different types of networks.

b) Give brief history and structure of the Internet.

(7+8)

6.

a) i) If we need to download text documents at the rate of 100 pages per minute, what is the required bit rate of the channel? Assume that a page has an average of 24 lines with 80 characters in each line.

ii) A signal travels through an amplifier and its power is increased to 10 times. That is p2= 10p1. Give the formula to calculate amplification (gain of power).

b) Briefly describe OSI model with necessary diagram.

(6+9)

7.

a) Which technique can be used to combine signals from different sources to fit into a larger bandwidth such as wireless applications? Discuss the techniques in very brief.

b) What is slotted ALOHA? Explain frame collision in it by giving an example.

(7+8)

8.

a) Write a short note on guided media that provide conduit (channel/path) from one device to another.

b) Which is the most common protocol for point to point access? Which services it can provide? Explain.

(7+8)

9.

a) Differentiate IPv4 and IPv6. Give two to three main points only.

b) What is cryptography? What are the components involved in it? Explain in brief.

c) Write a short note on firewalls.

(3+4+8)