A9-R3: DATA COMMINICATION AND COMPUTER 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. (1x10)

1.1 A _____ can forward or block packets based on the information in the network layer and transport layer headers.
A) Proxy firewall
B) Packet Filter Firewall
C) Message Digest
D) Private Key

1.2 Digital information is _____.
A) Continuous
B) Discrete
C) Random
D) None of the above

1.3 Which of the following field contains the permanent virtual circuit address in Frame Relay?
A) EA
B) FECN/BECN
C) DE
D) DLCI

1.4 In radio communication, spectrum is divided into bands based on _____.
A) Amplitude
B) Frequency
C) Cost and Hardware
D) Transmission Medium

1.5 "Store and Forward" is an example of _____ switching.
A) Packet
B) Circuit
C) Message
D) Cell

1.6 Which of the following uses network topology to create routing table?
A) Distance Vector Routing Protocol
B) Link State Routing Protocol
C) Border Gateway Protocol
D) None of the above

1.7 Which one of the following uses a computerized center that is responsible for connecting calls, recording call information, and billing in GSM network.
A) Base Station
B) Mobile Switching Center
C) Mobile Station
D) None of the above

1.8 Which one of the following is full form of BSC?
A) Byte-Oriented synchronous communication
B) Bit-Oriented synchronous communication
C) Binary synchronous communication
D) Binary synchronous control

1.9 In data communication, ATM is acronym for _____.
A) Automated Teller Machine
B) Automatic Transmission Model
C) Asynchronous Telecommunication Method
D) Asynchronous Transfer Mode

1.10 The purpose of MTA (Mail Transfer Agent) is _____.
A) Envelope preparation
B) Message preparation
C) Transferal of messages over the internet
D) All of the above

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 SDLC is a Character Oriented Protocol.
2.2 ICMP is used to report error in TCP/IP protocol stack.
2.3 Network Switch functions as multiport repeater.
2.4 Both twisted pair and coaxial cable transmit data in the form of an electro-magnetic wave.
2.5 Global Positioning System (GPS) satellites are medium-earth-satellites that provide time and location information for vehicles and ships.
2.6 Multiplexing is the simultaneous transmission of multiple signals across a single data link.
2.7 ARP is used to find out MAC address of corresponding IP address.
2.8 CDMA employs spread-spectrum technology and a special coding scheme to allow multiple users to be multiplexed over the same physical channel.
2.9 SMTP is a client-server application that allows a user to log on to a remote machine, giving the user access to the remote system.
2.10 Data transparency in BSC is achieved by a process called byte stuffing.

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	One of the transmission modes	**A.**	SNMP
3.2	In Router, a term which allows packets to pass through it	**B.**	Guided Media
3.3	Shortest frame in HDLC protocol	**C.**	Ethernet
3.4	A service, used to map IP address to URL	**D.**	Triangle
3.5	A device which follows physical layer broadcasting	**E.**	Supervisory
3.6	Example of Token Ring Topology	**F.**	FDDI
3.7	Bit Oriented Protocol	**G.**	Simplex
3.8	Shape of Cell in Cellular Radio	**H.**	HDLC
3.9	Datalink layer Protocol	**I.**	Filtering
3.10	The media having physical Boundary	**J.**	DNS
		K.	Hexagon
		L.	Unguided Media
		M.	Hubs
		N.	Forwarding

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.	Twisted Pair	**B.**	CDMA	**C.**	DLCI
D.	Router	**E.**	Packet	**F.**	Co-axial
G.	Security Association	**H.**	TCP	**I.**	Core
J.	Flag	**K.**	TDMA	**L.**	Bridge
M.	DCM	**N.**	LMI	**O.**	Encryption
P.	Circuit	**Q.**	Cladding	**R.**	PCM

4.1 The HDLC _____ field defines the beginning and end of frame.

4.2 _____ is a protocol to control and manage interfaces in Frame Relay networks.

4.3 _____ can act as a Gateway.

4.4 IPSec requires a logical connection between two hosts using a signaling protocol called _____.

4.5 _____ is a digital representation of analog signal where the magnitude of the signal is sampled regularly at uniform intervals.

4.6 _____ cable consists of an inner copper core and a second conducting outer stealth.

4.7 Fiber-optic cables carry data signals in the form of light. The signal is propagated through _____ by reflection.

4.8 _____ is a connection less protocol.

4.9 GSM uses _____ for multiplexing.

4.10 In _____ switching path is established before actual communication take place.

PART TWO

(Answer any **FOUR** questions**)**

5.

a) What are the two most popular protocols that are used in Internet? Explain them briefly.

b) What is circuit switching? Discuss how packet-switching is better than circuit-switching for computer to computer communication.

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

(5+5+5)

6.

a) How optical signals travel through fiber cable? Explain it with a suitable diagram.

b) Draw and briefly explain the comparison of X.25 and frame relay protocol stacks.

c) What is meant by simplex, half duplex and full duplex communication system? Give representative examples of each.

(5+5+5)

7.

a) PCM is used to convert Analog signal into Digital signal. Write down steps, how PCM converts analog into digital signal.

b) What is High Speed LANs? Describe briefly the various types of High Speed LANs.

c) An OSI model is a model that allows any two different systems to communicate regardless of their underlying architecture. Write the layers of OSI model and explain functionality of the lower two layers.

(5+5+5)

8.

a) Congestion in a network is a problem that must be controlled because it decreases throughput and increases delay. How do frame relay manage congestion in network?

b) "Ethernet is not suited to be used a real-time environment." Do you agree with this statement? Give your reasons.

c) Bridge operates in both the physical and the data link layers of OSI model. How does bridge connect two different networks? What are the types of bridges?

(5+5+5)

9.

a) Explain using the IP address 192.33.45.104, how a subnet mask is used to extract the network number and the host number.

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

c) How does a single bit-error differ from a burst-error? What are the four types of redundancy checks used in data communication?

(5+5+5)