A9-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 Which one of the following is a balanced interface?
A) RS-232C
B) RS-423C
C) RS-449
D) RS-422

1.2 A crossbar switch having n input lines and n output lines (i.e. n full duplex lines) has following number of intersections.
A) n
B) 2n
C) n^2
D) $2n^2$

1.3 Video on demand, Live television, from many sources, full motion multimedia, electronic mail is offered by
A) X.25
B) Frame Relay
C) N-ISDN
D) B-ISDN

1.4 The device operating at Data link layer is
A) Bridge
B) Router
C) Repeater
D) None of the above

1.5 Flow control is the mechanism to regulate the flow of information, so that a fast host cannot overrun a slow one. This is the function of the following OSI Layer

A) All Layers
B) Physical Layer
C) Transport Layer
D) Application Layer

1.6 The T1 carrier corresponding to time division multiplexing consists of following number of voice channels

A) 24
B) 12
C) 20
D) 32

1.7 In Cellular Mobile Communication handoff means

A) to disturb the signal
B) to disturb the antenna
C) to switch to a new channel when call is in progress
D) to switch off the MTSO

1.8 GSM stands for

A) Good Service Management
B) Global Service Management
C) Good Sender Memory
D) Global System for Mobile Communications

1.9 Dual cable and signal cable are the two types of

A) Broadband networks
B) Baseband networks
C) Radio networks
D) Satellite networks

1.10 TELNET, FTP, SMTP, Protocols fall in the following layer of OSI reference model

A) Transport Layer
B) Internet Layer
C) Network Layer
D) Application Layer

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 The cells used in Mobile Communications are triangular in shape.

2.2 X.25 is based on virtual circuit.

2.3 Two commonly used data link layer standards are RS-232-C and its successor RS-449.

2.4 PCM is not a common digital modulation method.

2.5 The ATM cells are 64 bytes long.

2.6 IP is a best-effort connectionless protocol.

2.7 The most popular network system in the PC world is Novell Netware.

2.8 The remote controls of TVs, VCRs and Stereo use Radio waves.

2.9 A new development in the communication satellite world is development of low cost microstations, sometimes called VSATs (Very Small Aperture Terminals).

2.10 Routing and switching in frame relay are performed by the data link layer.

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	Total Internal Reflection	**A.**	A simplex protocol
3.2	Cryptography	**B.**	Stop and wait protocol
3.3	Echo suppressor	**C.**	Fiber optics
3.4	Codec	**D.**	Security
3.5	Go back *n*	**E.**	Telephone System
3.6	Multiple access protocols	**F.**	Local loop
3.7	Logical Link Control	**G.**	Sliding window protocols
3.8	Polling	**H.**	IEEE 802.3
3.9	Firewall	**I.**	IEEE 802.4
3.10	Flow control & buffering	**J.**	Frame Relay
		K.	Pure ALOHA
		L.	IEEE 802.2
		M.	Satellite Networks
		N.	Internetworking
		O.	Transport Layer

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.	Cryptography	**B.**	HDLC	**C.**	Modem
D.	Star topology	**E.**	Analog Signal	**F.**	Framing
G.	Distributed queue dual bus	**H.**	CDPD	**I.**	Routing Algorithm
J.	Congestion	**K.**	Circuit	**L.**	SNA
M.	1 MHz	**N.**	Diffraction grating	**O.**	CDMA
P.	Traffic shaping	**Q.**	Crash Recovery	**R.**	Management Information base

4.1 _____ is one of the data link layer design issues.

4.2 _____ is IEEE standard 802.6.

4.3 _____ is a packet switched digital datagram service.

4.4 _____ is that past of the Network Layer software responsible for deciding which output line an incoming packet should be transmitted on.

4.5 When too many packets are present in the subnet, performance degrades this situation is called _____.

4.6 In WDM, an optical system uses a(n) _____.

4.7 _____, avoids time synchronization problem and also the channel allocation problem.

4.8 _____ is an approach to congestion management.

4.9 _____ is an element of transport protocol.

4.10 The collection of all possible objects in a network is given in a data structure called the _____.

PART TWO

(Answer any **FOUR** questions)

5.

a) Explain with the help of a neat labelled diagram the B-ISDN ATM reference Model.

b) Explain with the help of a neat labelled diagram the ISO-OSI Model and the function of its various layers.

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

(5+5+5)

6.

a) With respect to transmission media, compare Fiber Optics and Copper Wire.

b) Explain the concept of framing with respect to Data Link Layer.

c) Briefly explain the High-Level Data Link Control (HDLC) protocols with neat labelled diagrams.

(5+5+5)

7.

a) Compare the IEEE standards 802.2, 802.3, 802.4, 802.5 and 802.6 briefly.

b) Explain the difference between pure ALOHA and slotted ALOHA and draw diagrams for them.

c) What is high speed LANs? Describe briefly the various types of High-speed LANs used in computer communication networking.

(5+5+5)

8.

a) Explain the concept of IP protocols and addresses, subnets and Internet Control Protocols for the network layer in the Internet.

b) What are Routing Algorithms? Explain flooding, the optimality principle and shortest path routing.

c) What basic functions does a communication satellite perform? Give a good reason why up-link and down-link frequencies are not same. Why are earth dish antenna are generally parabolic in shape?

(5+5+5)

9. Write short notes on any **three**:

a) GSM

b) SONET

c) Novell Netware

d) Firewalls

(3x5)