

## 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 of the following are the smallest and largest possible values for an IP octet?
    - A) 0 and 512
    - B) 255 and 512
    - C) 0 and 256
    - D) 0 and 255
  - 1.2 The parameter Bit Error Rate (BER) plays more important role as compared to delay while transmitting
    - A) Data
    - B) Audio
    - C) Video
    - D) Compressed Video
  - 1.3 Seamless networking refers to
    - A) A complete end-to-end digital network.
    - B) Use of a single platform for end-to-end communication where geographical distance between communicating entities is hidden to the end user.
    - C) Use of a single platform for end-to-end communication where geographical distance between communication entities is visible to the end user.
    - D) Use of a single platform to transmit data, audio and video.
  - 1.4 In which of the following shape light pulses should be transmitted in order to cancel out nearly all the dispersion effects
    - A) Cosine
    - B) Triangular
    - C) Hyperbolic Cosine
    - D) Reciprocal of Hyperbolic Cosine

- 1.5 ARP is used to find
- A) IP address
  - B) MAC address
  - C) Subnet address
  - D) Host address
- 1.6 Throughput of simple ALHOHA is
- A) 18%
  - B) 18.8%
  - C) 36%
  - D) 36.8%
- 1.7 If satellite is in geosynchronous orbit, it completes one orbit in
- A) One day (24 hours)
  - B) One hour
  - C) One month
  - D) One year
- 1.8 Baud is
- A) Number of bits per second
  - B) Number of signal changes per second
  - C) Number of bytes per second
  - D) Number of characters per second
- 1.9 Router operates in
- A) Data Link Layer
  - B) Network Layer
  - C) Transport Layer
  - D) All of the above
- 1.10 In which ARQ, when a NAK is received, all frames sent since the last frame acknowledge are retransmitted
- A) Stop-and-Wait
  - B) Go back n
  - C) Selective Reject
  - D) Both A and B

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 All WANs are necessarily packet switched networks.
- 2.2 Frame relay uses large variable sized packets in contrast to ATM.
- 2.3 ASK is a technique to convert digital data to an analog signal.
- 2.4 Executable files can be transmitted using SMTP.
- 2.5 Today’s Cellular networks employ all three multiple access schemes namely FDMA, TDMA and CDMA.
- 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 Two computers cannot be connected via USB cable.
- 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 HTTP use port 80.

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 Connection Oriented WAN Technology	A. Telnet
3.2 Circuit Switched B Channels and Packet Switched D Channel	B. HDLC
3.3 RF based physical layer	C. CBR
3.4 Remote Login Protocol	D. HTTP
3.5 Connectionless protocol	E. Frame Relay
3.6 World Wide Web	F. TCP
3.7 Real Time Service	G. ISDN
3.8 Optical Transmission Systems	H. UDP
3.9 Number of hexadecimal digits in Ethernet address	I. 8
3.10 Data Link layer	J. ATM
	K. ABR
	L. FHSS
	M. 12
	N. WDM

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)

<b>A.</b>	CSMS/CD	<b>B.</b>	X.25	<b>C.</b>	Distance vector
<b>D.</b>	QAM	<b>E.</b>	Congestion control	<b>F.</b>	Token bus
<b>G.</b>	ATM	<b>H.</b>	48 Bytes	<b>I.</b>	PSK
<b>J.</b>	Encryption	<b>K.</b>	CSMA/CA	<b>L.</b>	Masquerade
<b>M.</b>	Routing	<b>N.</b>	Ethernet	<b>O.</b>	Link-state
<b>P.</b>	64 Bytes	<b>Q.</b>	Starting Delimiter	<b>R.</b>	SONET

- 4.1 IEEE 802.3 is popularly known as \_\_\_\_\_.
- 4.2 \_\_\_\_\_ is the network technology that can be used in both LAN and WAN.
- 4.3 The main characteristics of \_\_\_\_\_ are link-by-link flow control, sequence numbering and error checking.
- 4.4 In order to ensure that collisions can be detected by all nodes on the Ethernet network, the lower bound on Ethernet packet length is \_\_\_\_\_.
- 4.5 In order to share the transmission media wireless LANs use the \_\_\_\_\_ scheme.
- 4.6 \_\_\_\_\_ is the analog signaling technique used in ADSL and is a combination of amplitude and phase modulation.
- 4.7 Optimality principle is used in \_\_\_\_\_.
- 4.8 A(n) \_\_\_\_\_ takes place when one entity pretends to be a different entity.
- 4.9 The first field in a Token Ring frame is called \_\_\_\_\_.
- 4.10 Routing protocols based on \_\_\_\_\_ does not exchange their routing tables periodically.

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

- 5.**
- a) Write in brief the features of the following transmission media:
    - i) Coaxial Cable
    - ii) Fiber Optic Cable
  - b) Find out the capacity of a telephone line that transmits frequencies from 300 Hz to 3400 Hz with a signal to noise ratio of 35dB.
  - c) What is pulse code modulation? What is the equivalent bit rate of a PCM channel having bandwidth of 4 KHz?
- (8+3+4)**
- 6.**
- a) What is the difference between: -
    - i) datagram subnet and virtual-circuit subnet.
    - ii) circuit switching and packet switching.
  - b) What advantages does TCP have over UDP? What are the features, which make TCP a reliable protocol?
  - c) Explain the function of: Repeater, Bridge and Gateways.
- (8+[2+2]+3)**
- 7.**
- a) Explain the operation of CRC error detection method. By means of an example show how:
    - i) The error detection bits are generated
    - ii) The received frame is checked for transmission errorsUse the generator polynomial  $x^5 + x^4 + x^2 + x + 1$
  - b) What is static routing? How does it differ from dynamic routing?
  - c) Discuss the problem of count to infinity associated with distance vector routing technique.
- (8+4+3)**
- 8.**
- a) What are the reasons for congestion in a network? Describe any one method for congestion control.
  - b) Could HDLC be used as a data link protocol for a LAN? Explain your answer.
  - c) Describe the advantages of a small cell size in ATM.
- (7+4+4)**
- 9.** Write short notes on any three:
- a) SNMP
  - b) VPN
  - c) Firewall
  - d) GSM
- (5+5+5)**