

## B2.4-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	<b>A.</b> Telnet
3.2 Circuit Switched B Channels and Packet Switched D Channel	<b>B.</b> HDLC
3.3 RF based physical layer	<b>C.</b> CBR
3.4 Remote Login Protocol	<b>D.</b> HTTP
3.5 Connectionless protocol	<b>E.</b> Frame Relay
3.6 World Wide Web	<b>F.</b> TCP
3.7 Real Time Service	<b>G.</b> ISDN
3.8 Optical Transmission Systems	<b>H.</b> UDP
3.9 Number of hexadecimal digits in Ethernet address	<b>I.</b> 8
3.10 Data Link layer	<b>J.</b> ATM
	<b>K.</b> ABR
	<b>L.</b> FHSS
	<b>M.</b> 12
	<b>N.</b> 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 errors  
Use 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)**