

## A9-R4: DATA COMMUNICATION & NETWORKS 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 **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 Interleaved digital signals from n devices forming frame of data take place in
    - A) FDM
    - B) TDM
    - C) WDM
    - D) None of the above
  - 1.2 Upper support layers - session, presentation and application of OSI model are almost invariably implemented in
    - A) Hardware (only)
    - B) Software (only)
    - C) Hardware and Software both
    - D) None of the above
  - 1.3 IN CSMA system, listening for existing traffic on line is done by checking
    - A) Voltage
    - B) Current
    - C) Audio signals
    - D) None of the above
  - 1.4 In coaxial cable, the metallic shield acts also as
    - A) Second conductor to complete circuit
    - B) Protector from the lightening
    - C) Generator of noise
    - D) None of the above
  - 1.5 Transmission errors are usually corrected at OSI model's
    - A) Physical layer
    - B) Data link layer
    - C) Network layer
    - D) None of the above

- 1.6 Bridges (of Intermediate System) operate at OSI – 7 layer architecture layer
- A) 2 (Data link layer)
  - B) 3 (Network layer)
  - C) 4 (Transport layer)
  - D) None of the above
- 1.7 Protocol which is used to find the Physical address of node when IP address is known in WAN, is
- A) Internet Control Message Protocol (ICMP)
  - B) Dynamic Host Configuration Protocol (DHCP)
  - C) Address Resolution Protocol (ARP)
  - D) None of the above
- 1.8 Routing decisions are not based in measurement or estimates of the current traffic and topology in
- A) Hierarchical Routing
  - B) Static Routing
  - C) Dynamic routing
  - D) None of the above
- 1.9 TCP/IP protocol which supports electronic mail on Internet is called
- A) Trivial File Transfer Protocol (TFA)
  - B) Simple Mail Transfer Protocol (SMTP)
  - C) Mail Transfer Agent (MTA)
  - D) None of the above
- 1.10 Firewall is normally installed in
- A) Transport layer
  - B) Data Link layer
  - C) Network layer
  - D) None 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 FSK modulation requires more bandwidth than ASK and PSK.
- 2.2 Packet switching is generally more efficient than circuit switching for voice communication.
- 2.3 In slotted ALOHA, time on channel is organized into uniform slots whose size equals the frame transmission time.
- 2.4 Optical fiber is not suitable for applications where hardware portability is required.
- 2.5 Logical Link Layer (LLC) is same for all IEEE defined LAN.
- 2.6 DCF (Distributed Coordination function of Wireless LAN) includes a collision-detection function (i.e. CSMA/CD)
- 2.7 IPv6 is compatible with IPv4.
- 2.8 www uses the concept of hyper text and hyper media.
- 2.9 Cost of transmitting a message through satellite is dependent on the distance traversed.
- 2.10 The art of breaking cipher is called cryptography.

**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	Characterization of sine wave	A.	SONET
3.2	Transport layer of TCP/IP	B.	UTP Cable
3.3	Carrier for ISDN and B-ISDN	C.	IPv6
3.4	Preventing penetration of electromagnetic noise and cross talk	D.	Objects
3.5	Packet-switching Wide Area Network	E.	Token ring
3.6	FDDI	F.	Shielded Twisted Pair Cable (STP)
3.7	Simple Internet Protocol Plus (SIPP)	G.	Satellite
3.8	Used mainly to access data on World Wide Web	H.	Internet working Protocol (IP)
3.9	Very Small Aperture Terminals	I.	X.25
3.10	Variable in SNMP literature	J.	Phase
		K.	IPv4
		L.	User Datagram Protocol (UDP)
		M.	HTTP

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)

<b>A.</b>	Address Resolution Protocol (APR)	<b>B.</b>	3	<b>C.</b>	$2^3$
<b>D.</b>	Cell	<b>E.</b>	3 Network layer	<b>F.</b>	Bit Oriented
<b>G.</b>	Byte Oriented	<b>H.</b>	DSL	<b>I.</b>	1 Physical layer
<b>J.</b>	Spread spectrum	<b>K.</b>	Agent	<b>L.</b>	TELNET
<b>M.</b>	UDP				

- 4.1 \_\_\_\_\_ uses existing telecommunication networks to accomplish high speed delivery of data, voice and multimedia.
- 4.2 The basic data unit in an ATM network is \_\_\_\_\_.
- 4.3 The essential idea of \_\_\_\_\_ technique is to spread the information signal over a wider bandwidth in order to make jamming and interception more difficult.
- 4.4 For global transmission, minimum number of equidistant satellites from each other in geosynchronous orbit is \_\_\_\_\_ to provide full coverage.
- 4.5 HDLC is \_\_\_\_\_ data link protocol.
- 4.6 A Router operates at layer \_\_\_\_\_ in OSI-7 layer architecture.
- 4.7 The protocol for asking the owner of particular IP address and getting the reply is called \_\_\_\_\_.
- 4.8 \_\_\_\_\_ provides a way for applications to send encapsulated raw IP datagram and send them with out having to establish a connection.
- 4.9 \_\_\_\_\_ is a general purpose client server application program which enables establishment of a connection to a remote system in such a way that local terminal appears to be terminal at remote system.
- 4.10 A node must be capable of running an SNMP management process, called SNMP \_\_\_\_\_.

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

- 5.**  
a) What is Flow Control? Explain Sliding window method of flow control in data communication.  
b) What is multiplexing? Explain FDM and TDM methods along with differences and similarities.  
**(6+9)**
- 6.**  
a) What is packet switching? Explain datagram approach and virtual circuit approach. What are the differences between circuit switched connection and virtual-circuit connection?  
b) Explain Open System Interconnect model, emphasizing the functions of each layer. How does TCP/IP protocol suit can be interpreted in light of OSI mode?  
**(7+8)**
- 7.**  
a) Explain FDDI LAN protocol in detail emphasizing access method, signaling used along with data rate and compare it with Ethernet on these four parameters.  
b) How do persistent and non-persistent CSMA protocols are improvement over ALOHA? What is CSMA/CD? Explain in detail.  
**(8+7)**
- 8.**  
a) What are desirable characteristics of routing algorithm and why? Differentiate between Static and dynamic routing.  
b) Explain how does e-mail reach to destination? Explain in brief SMTP emphasizing the role and function of User Agent (UA) and Mail Transfer Agent (MTA).  
**(8+7)**
- 9.** Write short notes on:  
a) SSL / TLS  
b) X.25  
c) Guided Media v/s Unguided Media  
d) Fire Wall  
e) Framing  
**(5x3)**