

## A9-R4: DATA COMMUNICATION AND NETWORK 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 What is true in case of CHAP?
    - A) It uses a three-way handshake
    - B) It encrypts the process using RC4
    - C) It repeats the challenge at random intervals
    - D) It is stronger than Kerberos
  - 1.2 Which of the following is a MUST have for all implementations of IPSec?
    - A) Security Association
    - B) Security ID
    - C) Serial number
    - D) Version number
  - 1.3 The data communication medium which converts digital signals from a PC into analog signals that can be transmitted over telephone lines is:
    - A) Lease Line
    - B) Switch
    - C) Modem
    - D) Router
  - 1.4 Receiving and transmitting signals simultaneously over a wire is called:
    - A) Simplex Transmission
    - B) Half Duplex transmission
    - C) Full Duplex transmission
    - D) None of the above
  - 1.5 Which one of the following Internetworking devices operates at Physical layer of OSI model?
    - A) Router
    - B) Repeater
    - C) Gateway
    - D) All of the above

- 1.6 Which of the following can be an Ethernet Physical address?
- A) C4-17-FE-0B-6F-0A
  - B) 1A-2B-3C-4D-5E
  - C) 01:02:03:04:05:06:07
  - D) None of the above
- 1.7 The length of an IPv6 address is \_\_\_\_ bits long:
- A) 32
  - B) 64
  - C) 128
  - D) Variable
- 1.8 SSL and TLS are similar but different, how?
- A) Both create a secure channel between a client and a server. TLS and SSL interoperate completely.
  - B) Both create a secure channel between a client and a server. TLS supports older SSL connections.
  - C) Both create a plaintext channel between a client and a server. TLS and SSL interoperate completely.
  - D) Both create a plaintext channel between a client and a server. TLS supports older SSL connections.
- 1.9 Which of the following is not a Shift keying technique?
- A) ASK
  - B) FSK
  - C) PSK
  - D) SSK
- 1.10 SONET is an acronym for:
- A) Standard Optical
  - B) Symmetric Open
  - C) Standard Open
  - D) Synchronous Optical

**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 The path that data travels between two computers is called a communication bridge.
- 2.2 In Broadcast Network a single Channel is shared by all machines on network.
- 2.3 Bridges cannot identify networks like routers can.
- 2.4 Phishing mail is a fake e-mail used to trick a user to reveal his/her personal information.
- 2.5 In cryptography, the encryption/decryption algorithms are public while keys are secret.
- 2.6 Digital signature is used to provide privacy.
- 2.7 ATM transmits switches and multiplexes information in fixed-length cells.
- 2.8 ALOHA communication is ideal for complex networks in which data travels multiple paths.
- 2.9 OSPF computes the shortest path for a route using Dijkstra’s algorithm.
- 2.10 A proxy server is used to bypass INTERNET security and parental controls.

**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	A Machine that keeps other machines behind it as anonymous	A.	ADHOC
3.2	Authenticates and encrypts each packet of data stream.	B.	DNS
3.3	It is the most widely used cell phone technology	C.	GSM
3.4	This protocol is used by outlook express to fetch mails from the mail server	D.	LEASE LINE
3.5	Has a hierarchical structure and is the largest database.	E.	PROXY SERVER
3.6	Expensive but secure WAN technology	F.	POP
3.7	A wireless network where there is no single master node or AP	G.	CCITT
3.8	Organisation that sets International Communications standards	H.	IPSEC
3.9	Area Covered by the returning signal from the Satellite	I.	TDMA
3.10	Channel Access scheme used by most 2G mobile-phone standards.	J.	FOOTPRINT
		K.	FIREWALLS
		L.	PUBLIC KEY
		M.	FDMA
		N.	WIRELESS

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>	NAT	<b>B.</b>	FHSS	<b>C.</b>	QPSK
<b>D.</b>	TCP	<b>E.</b>	PUBLIC	<b>F.</b>	FDDI
<b>G.</b>	ADSL	<b>H.</b>	DHCP	<b>I.</b>	ICMP
<b>J.</b>	SIP	<b>K.</b>	IEEE	<b>L.</b>	FSK
<b>M.</b>	UDP				

- 4.1 \_\_\_\_\_ is an Internet Engineering Task Force (IETF) standard protocol for initiating an interactive user session that involves multimedia elements such as video, voice, chat, gaming, and virtual reality.
- 4.2 \_\_\_\_\_ encodes two bits per symbol and has four possible states.
- 4.3 \_\_\_\_\_ signal does not stay in one place on the band and it can elude a jammer.
- 4.4 The host uses \_\_\_\_\_ to retrieve its IP address and other configuration information from a specific server.
- 4.5 The distinguishing characteristic of \_\_\_\_\_ over other forms of Digital Subscriber Lines is that the bandwidth is greater in the direction to the customer premises than the reverse.
- 4.6 \_\_\_\_\_ is a standard for data transmission on fibre optics and based on Token Ring Technology.
- 4.7 The practical solution to impeding exhaustion of IP addresses is \_\_\_\_\_.
- 4.8 The Reliable Transport Protocol that is connection oriented is called \_\_\_\_\_.
- 4.9 The protocol that is mostly used for trouble-shooting IP networks is called \_\_\_\_\_.
- 4.10 A \_\_\_\_\_ key cryptography approach involves use of asymmetric key algorithms.

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

- 5.**
- a) What is a single mode and multimode Optical fibre? Name any four advantages of optical fibre as a communication medium?
  - b) Draw the layered structure of OSI model and TCP/IP model.
  - c) Describe briefly Frequency Division Multiplexing (FDM) and Time Division Multiplexing (TDM) techniques with relevant diagrams.
- (5+5+5)**

- 6.**
- a) Differentiate between the guided and unguided media? State the four basic types of guided media?
  - b) Why is it important for protocols configured on the top of Ethernet to have a length field in their header, indicating how long the message is? Discuss what kinds of problems arise when two computers on the same Ethernet share the same MAC (hardware) address.
  - c) The ASCII character B is transmitted with an even-parity bit appended to it. Illustrate how the receiver would detect an error.
- (5+5+5)**

- 7.**
- a) What is a Virtual LAN? When should you consider using a VLAN in your network?
  - b) Describe the functioning of a Router in a network?
  - c) What is the difference between an Ethernet switch and an Ethernet hub? Which is more suitable for a network with a high traffic load, a switch or a hub? Explain.
- (5+5+5)**

- 8.** Write short notes on any **three** of the following?
- a) World Wide Web (WWW)
  - b) Domain Name System (DNS)
  - c) Simple Network Management Protocol (SNMP)
  - d) Modem
- (3x5)**

- 9.**
- a) Why is it essential to restrict the access of wireless network? Mention any three steps to protect/secure your wireless network.
  - b) What is VPN? Explain tunnelling with relation to VPN.
  - c) Mention five good security practices while using a computer system at a cyber cafe.
- (5+5+5)**