# A9.3-R5 : NETWORK MANAGEMENT

**अवधि : 03 घंटे** **अधिकतम अंक : 100**
**DURATION : 03 Hours** **MAXIMUM MARKS : 100**

| **ओएमआर शीट सं. :** **OMR Sheet No. :** | | | | | | |
|---|---|---|---|---|---|---|

**रोल नं. :** **Roll No. :** | | | | | | |

**उत्तर-पुस्तिका सं. :** **Answer Sheet No. :** | | | | | | |

**परीक्षार्थी का नाम :** **परीक्षार्थी के हस्ताक्षर :**
**Name of Candidate :** _____ ; **Signature of Candidate :** _____

| **परीक्षार्थियों के लिए निर्देश :** | **Instructions for Candidates :** |
|---|---|
| कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यानपूर्वक पढ़ें। | Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet. |
| प्रश्न-पुस्तिका अंग्रेजी भाषा में है। परीक्षार्थी उत्तर लिखने के लिए केवल अंग्रेजी भाषा का ही प्रयोग कर सकते हैं। | Question Paper is in English language. Candidate has to answer in English language only. |
| इस मॉड्यूल/पेपर के **दो भाग** हैं। **भाग एक** में **चार** प्रश्न और **भाग दो** में **पाँच** प्रश्न हैं। | There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions. |
| **भाग एक** ''वैकल्पिक'' प्रकार का है जिसके कुल अंक **40** है तथा **भाग दो** ''व्यक्तिपरक'' प्रकार का है और इसके कुल अंक **60** है। | **PART ONE** is Objective type and carries **40** Marks. **PART TWO** is Subjective type and carries **60** Marks. |
| **भाग एक** के उत्तर, इस प्रश्न-पत्र के साथ दी गई **ओएमआर उत्तर-पुस्तिका** पर, उसमें दिये गए अनुदेशों के अनुसार ही दिये जाने हैं। **भाग दो** की उत्तर-पुस्तिका में **भाग एक** के उत्तर **नहीं** दिये जाने चाहिए। | **PART ONE** is to be answered in the **OMR ANSWER SHEET** only, supplied with the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**. |
| **भाग एक** के लिए अधिकतम समय सीमा **एक घण्टा** निर्धारित की गई है। **भाग दो** की उत्तर-पुस्तिका, **भाग एक** की उत्तर-पुस्तिका जमा कराने के पश्चात् दी जाएगी। तथापि, निर्धारित एक घंटे से पहले **भाग एक** पूरा करने वाले परीक्षार्थी **भाग एक** की उत्तर-पुस्तिका निरीक्षक को सौंपने के तुरंत बाद, **भाग दो** की उत्तर-पुस्तिका ले सकते हैं। | 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** to the Invigilator. |
| **परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना और अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल/कमरा नहीं छोड़ सकते हैं। ऐसा नहीं करने पर, परीक्षार्थी को इस मॉड्यूल/पेपर में अयोग्य घोषित कर दिया जाएगा।** | **Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/ Paper.** |
| प्रश्न-पुस्तिका को खोलने के निर्देश मिलने के पश्चात् एवं उत्तर लिखना आरम्भ करने से पहले उम्मीदवार यह जाँच कर सुनिश्चित कर लें कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है। | After receiving the instruction to open the booklet and before starting to answer the questions, the candidate should ensure that the Question Booklet is complete in all respect. |

**जब तक आपसे कहा न जाए, तब तक प्रश्न-पुस्तिका न खोलें।**
**DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

## PART ONE

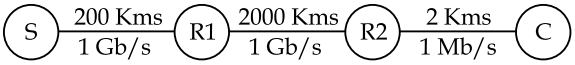
**(Answer all the questions; each question carries ONE mark)**

**1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)**

1.1 Which of the following is true about routers ?
- (A) Routers reassemble IP fragments if the next link can handle the full datagram.
- (B) Routers can drop packets.
- (C) Routers cannot change the IP packets that they forward.
- (D) On a router with many 1 Gbps ports, the router backplane can only handle 1 Gbps on the shared bus, leading to potential congestion.

1.2 Which of the following is/are true about DNS ?
- (A) A query for an A record may return multiple IP addresses in the response.
- (B) A query for an NS record may return multiple IP addresses in the response.
- (C) A short TTL on an NS record reply runs the risk of increasing traffic at the root or GTLD name servers.
- (D) A short TTL on an A record reply runs the risk of increasing traffic at the root or GTLD name servers

1.3 The figure below shows a network path connecting a server to a client.




What is the total transmission delay of a 10,000 bit packet on all of the links ?
- (A) 10 ms
- (B) 10.02ms
- (C) 22.02ms
- (D) 20ms

1.4 In TCP congestion control Slow Start Phase what will be the *cwnd* size after 3rd RTT:
- (A) 1
- (B) 4
- (C) 8
- (D) 16

1.5 The Routing Information Protocol (RIP) is an interdomain routing based on :
- (A) distance vector routing
- (B) link state routing
- (C) path vector routing
- (D) none of the above

1.6 An organization is granted a block of classless addresses with the starting address 199.34.76.64/28. How many addresses are granted ?
- (A) 16
- (B) 8
- (C) 32
- (D) 64

1.7 In the sending computer, UDP receives a data unit from the :
- (A) Transport Layer
- (B) Application Layer
- (C) Network Layer
- (D) None of the above

1.8 What is the hexadecimal equivalent of the Ethernet address 01011010 00010001 01010101 00011000 10101010 00001111 ?
- (A) 5A:88:AA:18:55:F0
- (B) 5A:11:55:18:AA:0F
- (C) 5A:18:5A:18:55:0F
- (D) 5A:81:BA:81:AA:0F

1.9 What is size of Ethernet frame preamble field and what is first byte of the preamble ?
- (A) 64 bits, 10101010
- (B) 64 bits, 10101011
- (C) 56 bits, 10101011
- (D) 56 bits, 10101010

1.10 IP header has TTL. What is the purpose of this field ?
- (A) Provides total time to live of IP packet
- (B) Provides total time to reach the destination
- (C) Handles infinite looping of IP packets in the network
- (D) Is not decremented by the routers.



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**2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

**(1x10)**

2.1 CIDR allocates IP addresses less efficiently than Classful Addressing

2.2 A host with 192.9.200.14 IP address is attached to a Class B of IP network

2.3 In pure ALOHA, the vulnerable time is twice the frame transmission time

2.4 TCP is a message oriented protocol

2.5 The Internet is a packet-switched network

2.6 The acknowledgment number in TCP is cumulative

2.7 Encapsulation is the process of capturing and reading data as it travels across the Internet

2.8 Acknowledging every TCP packet with a separate ACK is useful because it keeps the transmitters' congestion window size constant

2.9 Two distinct Web pages (for example, www.mit.edu/research.html and www.mit.edu/students.html) cannot be sent over the same persistent connection.

2.10 In a hard handoff, a mobile station only communicates with one base station.

3. **Match words and phrases in column X with the closest related meaning / words(s) / phrase(s) in column Y. Enter your selection in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

**(1x10)**

| Column X | | Column Y | |
|---|---|---|---|
| 3.1 | MAN | A. | Error detection |
| 3.2 | OSI 7 layer model | B. | Router |
| 3.3 | Flow control | C. | History |
| 3.4 | DNS | D. | Metropolitan area network |
| 3.5 | Subnetting | E. | A protocol design for computer networks |
| 3.6 | Cookies | F. | HTTP |
| 3.7 | Bandwidth | G. | TCP |
| 3.8 | Routing | H. | Recursive Query Processing |
| 3.9 | Segment | I. | Application Layer |
| 3.10 | CRC | J. | IP address |
| | | K. | Transport Layer |
| | | L. | UDP |
| | | M. | measured in kilobits or megabits per second |

4. **Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Choose the most appropriate option, enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

**(1x10)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | 20,21 | B | 128 | C | DNS Resolver | D | ICMP |
| E | 3-way handshake | F | 48 | G | TCP FLOW Control | H | Simple Mail Transfer Protocol |
| I | DNS | J | UDP | K | 16 | L | html |
| M | Binary exponential back off | | | | | | |

4.1 SMTP stands for _____.

4.2 A port address in UDP is _____bits long.

4.3 FTP works on two ports, namely, _____.

4.4 Silly window syndrome relates to _____.

4.5 MAC address is _____bits long.

4.6 The language used to develop web pages is called _____.

4.7 IPv6 address is _____ bits long.

4.8 Ping is used by _____ protocol.

4.9 Service responsible for translation of hostname to IP address is _____.

4.10 To achieve stability in CSMA/CD back off scheme, a technique known as _____ is used.

## PART TWO

**(Answer any FOUR questions)**

**5.** (a) State advantages and disadvantages of persistent HTTP connections.

(b) Differentiate between Circuit and Packet Switching

(c) What do DNS Resolvers do ? How does DNS caching work ?

**[4+3+8]**

**6.** (a) Describe the use of TCP Flags.

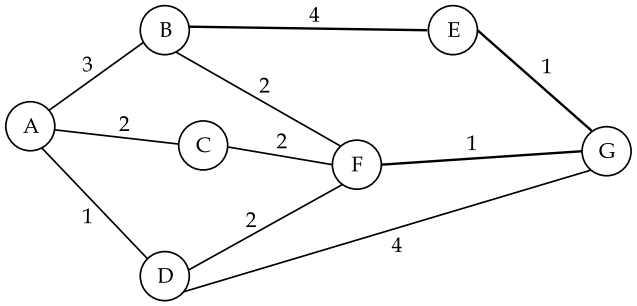
(b) Distinguish between Go-back-N and Selective Repeat Protocols

(c) Explain congestion control mechanism of TCP using proper RTT vs *cwnd* graph

**[3+8+4]**

**7.** (a) Why routing is done ? State two differences between Link State Routing and Distance Vector Routing.

(b) The network shown in Figure below uses a Link State Routing protocol. Construct a Shortest Path Tree for node A, using Dijkstra's algorithm




(c) For a host in a subnet with an IP network address 192.168.0.64, find out IP network address, the host range, and the subnet mask for a subnet that can contain up to 30 clients. What is the maximum number of hosts per subnet if you have 24 subnet mask bits ?

**[4+8+3]**

**8.** (a) Compute the efficiency of slotted Aloha protocol.

(b) Measurement of a slotted ALOHA channel with an infinite number of users showed that 10 percent of the slots were idle. What is the channel load, G? What is the throughput?Is the channel underloaded or overloaded ?

(c) A network using CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time (including (including the delays in the devices and ignoring the time needed to send a jamming signal) is 25.6 μs, what is the minimum size of the frame?

**[8+4+3]**

**9.** (a) Explain hidden nodes in wireless communication.

(b) Explain following timers used in Retransmission Time Out (RTO) computation used by TCP.

(c) What is the role of three duplicate acknowledgements in TCP ?

**[4+8+3]**

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**SPACE FOR ROUGH WORK**

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