

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, May 2025
B.Tech. CCE Semester VI

Roll No.....

CS1140: Computer Networks

Time: 2.5 hours

Max. Marks: 30

Instructions to students:

1. non-programmable **Scientific calculator is allowed.**
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Short answer type questions (2 questions @ 2 marks each)

I. Describe the functions of the Session Layer and provide examples of where it's used in real-world applications.

**02
Marks
CO3**

II. Compare the security implications of using public IP addresses versus private IP addresses. Discuss how private IP addresses enhance network security by providing a level of isolation and access control within local networks.

**02
Marks
CO4**

Q.1B Given the following CIDR entries in a router's routing table:

Address/Mask	Next Hop
192.168.10.0/24	Router 1
192.168.20.0/22	Router 2
10.0.0.0/8	Interface 0
172.16.0.0/12	Router 3
Default	Router 4

**04
Marks
CO5**

For each of the following IP addresses, determine the next hop with calculations:

- (A) 10.20.30.40
(B) 192.168.5.5
(C) 192.168.30.100
(D) 172.16.5.10
(E) 192.51.100.100

Q.2A Describe the life cycle of an email from creation to delivery using SMTP, POP3, and IMAP. Include the role of mail servers, DNS, MIME encoding, and ports used in each stage

**04
Marks
CO2**

Q.2B	You are given the following hexadecimal dump of a TCP header (first 20 bytes): 00 50 13 88 12 34 56 78 9A BC DE F0 50 18 04 00 1C 46 00 00 Tasks: 1. Identify the Source Port and Destination Port. 2. Extract the Sequence Number and Acknowledgment Number. 3. Determine the Header Length. 4. Decode the Control Flags. 5. What is the Window Size? 6. What is the Checksum and Urgent Pointer value?	03 Marks CO4
Q.3A	A company has 100 employees and uses a single DHCP server. The server is configured with a scope of 192.168.1.100 to 192.168.1.200. a) What will happen if more than 101 devices try to connect to the network? b) Suggest a solution to avoid IP address exhaustion. c) How can the administrator ensure that printers and network switches always receive the same IP address?	03 Marks CO2, CO5
Q.3B	You have an IP packet of 5200 bytes that needs to be transmitted over a network with an MTU of 1500 bytes. The IP header is 20 bytes. a) How many fragments will be created? b) What will be the data size for each fragment (excluding the IP header)? c) What will the offset size and Flag values for each fragment be? d) If the first fragment gets dropped due to network congestion, what happens to the reassembly process at the destination? e) How does fragmentation affect routing decisions in terms of efficiency and packet delivery?	04 Marks CO4, CO2
Q.4A	Hospital Network Infrastructure Design A new multi-specialty hospital is being built with three major departments: • Emergency Wing (Wing A): Requires continuous, real-time access to patient data and monitoring systems. • Outpatient Wing (Wing B): Includes consultation rooms, labs, and waiting areas; requires both wired and wireless network access. • Administrative Wing (Wing C): Handles billing, patient records, HR, and internal communications. a) What kind of network should be deployed in Wing A, and what network devices and technologies are most suitable for its critical functions? b) Suggest a networking solution for Wing B that balances high availability,	05 Marks CO2, CO3, CO5

mobility for staff, and moderate bandwidth needs.

c) What type of network infrastructure is appropriate for Wing C, where security of internal records and controlled access are primary requirements?

d) How should the three wings be interconnected, and where should the main Internet gateway and firewall be placed?

e) Draw a network topology to reflect your design. Label all major components including routers, core switches, wireless access points, and servers.

Q.4B An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows.

- The first group has 200 medium-size businesses: each need 128 addresses.
- The second group has 400 small businesses: each need 16 addresses.
- The third group has 2000 households: each need 4 addresses.

Design the sub blocks and give the slash notation for each block. Find out how many addresses are still available after these allocations.

OR

Q.4B A company wants to build a custom file-sharing service. Evaluate whether to use FTP, SFTP, or a custom HTTP-based API. Discuss factors such as security, firewall compatibility, authentication, and ease of use.

03

Marks

CO2

03

Marks

CO1

***** All The Best*****

