K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:INT	Pattern:2022
Name of Course:Communication Networks	Course Code:INT223017
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains Two page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Examine critically how resource allocation techniques in packet and circuit switching affect the scalability and efficiency of networks. Provide examples from the real world to back up your response	(6)	1
Question No. 2			
2a)	What are the different types of Medium Access Control protocols? Explain Random Access, Controlled Access, and Channelization in detail.	(6)	2
Question No. 3			
3a)	What is subnetting? Given the IP address 192.168.10.0/24, divide it into 4 equal subnets. Show the subnet mask and range of each subnet.	(5)	3
	OR		
3b)	What is Path Vector Routing? How is it used in inter-domain routing? Illustrate with an example.	(5)	3
3c)	What are the main features of the IPv6 protocol? How does the IPv6 header differ from the IPv4 header?	(5)	3
	OR		
3d)	Explain the main services provided by the Network Layer. How do these services differ in connection-oriented and connectionless networks?	(5)	3
3e)	A company is planning to implement its own custom communication protocol over the network layer. As a network architect, which network layer services would you retain or replace, and how would this affect interoperability with existing internet systems?	(6)	3
	OR		
3f)	An ISP with 1000 small customers wants to reduce routing overhead using supernetting. Given several adjacent /24 blocks (e.g., 192.168.0.0/24 to 192.168.3.0/24), show how they can be aggregated. What conditions must be met for successful summarization?	(6)	3
Question No. 4			

4a)	Explain the purpose of each field in the TCP segment header.	(5)	4
	OR		
4b)	Explain how TCP achieves flow control and error control. Illustrate your answer with an example where TCP handles out-of-order segments or retransmissions.	(5)	4
4c)	Explain the key services provided by the transport layer.	(5)	4
	OR		
4d)	Compare the working of UDP and TCP protocols.	(5)	4
4e)	Following is a dump of UDP header in Hexadecimal format 06 32 00 0D 00 1C E2 17	(6)	4

i. What is source port number?
ii. What is destination port number?
iii. What is total length of the user datagram?
iv. What is the length of the data?
v. Is packet directed from a client to server or vice versa?

What is the client process?

OR

4f)	The TCP three-way handshake is critical for connection setup. Describe how an attacker can exploit this mechanism in a SYN flood attack. What countermeasures exist in modern TCP implementations?	(6)	4

Question No. 5

5a)	Explain the function of DNS in website resolution and how it interacts with web browsers.	(5)	5
	OR		
5b)	Explain how MIME works to support multimedia content in emails (e.g., images, attachments)	(5)	5
5c)	Discuss the advantages of IMAP over POP3 in terms of server storage and message management.	(5)	5
	OR		
5d)	Explain FTP in terms of control and data connection? Explain any two FTP commands.	(5)	5
5e)	Explain how HTTPS provides security and why it is essential for modern web applications, especially in the context of e-commerce and online banking.	(6)	5
	OR		
5f)	Explain how SMTP, POP3, and IMAP work together to send and retrieve emails. Highlight differences in how POP3 and IMAP manage mail storage and access.	(6)	5

····· End of question paper·····