	UNIT-I	Marks	CO	BL	PO
1	Define Topology. Discuss in brief about computer network topologies.	[10M]	CO1	L2	1,2
2(a)	Define Data Communication. Different components of Data Communication.	[5M]	CO1	L2	1,2
(b)	Explain twisted pair with neat diagram.	[5M]	CO1	L2	1,2
3	Explain briefly about OSI reference model with neat sketch.	[10M]	CO1	L2	1,2
4	Compare and contrast the LAN, MAN and WAN with the pictorial representation and their protocols.	[10M]	CO1	L2	1,2
5	Illustrate TCP/IP reference model with a neat diagram.	[10M]	CO1	L3	1,2
6	Describe the Transmission Media. Explain various types of Transmission Media.	[10M]	CO1	L2	1,2
7(a)	Describe briefly about Frequency division Multiplexing.	[5M]	CO1	L2	1,2
(b)	Describe briefly about Time division Multiplexing.	[5M]	CO1	L2	1,2
8(a)	Explain different modes of transmission of data.	[5M]	CO1	L2	1,2
(b)	Describe brief note on guided transmission media.	[5M]	CO1	L2	1,2
9	List and explain various responsibilities of physical layer.	[10M]	CO1	L4	1,2
10	Explain different Network topologies and their advantages and disadvantages in detail.	[10M]	CO1	L2	1,2
11	Illustrate the significance of OSI layered architecture. Compare with TCP/IP model.	[10M]	CO1	L3	1,2
12(a)	Identify the representation of data and its flow.	[5M]	CO1	L3	1,2
(b)	Explain components in data communication.	[5M]	CO1	L2	1,2

	UNIT-II	Marks	CO	BL	PO
1(a)	Compare fixed sized framing with variable sized framing.	[5M]	CO2	L2	1,2,3,4
(b)	Demonstrate Bit Stuffing and character Stuffing with example.	[5M]	CO2	L2	1,2,3,4

2	Define error. Explain CRC error detection technique with an example.	[10M]	CO2	L2	1,2,3,4
3	Explain the need of Framing? Analyze bit stuffing for framing.	[10M]	CO2	L2	1,2,3,4
4	Explain the need of Framing? Analyze character stuffing for framing.	[10M]	CO2	L2	1,2,3,4
5	Demonstrate in detail about wired and Wireless LAN's.	[10M]	CO2	L2	1,2,3,4
6	Explain Ethernet frame format.	[10M]	CO2	L2	1,2,3,4
7	Explain about bridge and switch. Advantages and disadvantages.	[10M]	CO2	L2	1,2,3,4
8	A bit stream 1101011011 is transmitted using the standard CRC method. The generator polynomial is x^4+x+1. What is the actual bit string transmitted?	[10M]	CO2	L3	1,2,3,4
9	Describe check sum error detection technique with an example.	[10M]	CO2	L3	1,2,3,4
10	Explain procedure of hamming code with an example.	[10M]	CO2	L2	1,2,3,4
11	List out various error detection techniques. Explain about two dimensional parity checking with an example.	[10M]	CO2	L2	1,2,3,4
12	Explain hamming code. Suppose the number of data bits is 7. Calculate number of redundant bits to transmit data to the receiver.	[10M]	CO2	L3	1,2,3,4

UNIT-III		**Marks**	**CO**	**BL**	**PO**
1	Explain in detail about the Simplex Stop and Wait protocol and its drawbacks.	[10M]	CO3	L2	1,2,3,4,5
2	Explain briefly about Stop and Wait ARQ.	[10M]	CO3	L2	1,2,3,4,5
3	Explain briefly about Selective Repeat ARQ.	[10M]	CO3	L2	1,2,3,4,5
4	Describe draw backs of stop and wait protocol? How can they overcome by sliding window protocol?	[10M]	CO3	L3	1,2,3,4,5
5	Distinguish between pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA.	[10M]	CO3	L3	1,2,3,4,5

6	Describe the working principle of Carrier sense multiple access with collision Detection (CSMA/CD).	[10M]	CO3	L3	1,2,3,4,5
7(a)	How piggybacking useful in Stop and wait protocol.	[5M]	CO3	L3	1,2,3,4,5
(b)	Explain in brief about CSMA/CA.	[5M]	CO3	L2	1,2,3,4,5
8	Compare Stop and Wait, GBN, Selective repeat protocols.	[10M]	CO3	L3	1,2,3,4,5
9	List out flow control techniques of DLL. Explain bridges.	[10M]	CO3	L2	1,2,3,4,5
10(a)	Illustrate the function of Go-Back-N ARQ protocol in noisy channel.	[5M]	CO3	L3	1,2,3,4,5
(b)	In Go back 4, if every 6th packet that is being transmitted is lost and if total number of packets to be sent is 10, then how many transmissions will be required?	[5M]	CO3	L3	1,2,3,4,5
11(a)	Illustrate the function of Stop-and-wait protocol in noiseless channel.	[5M]	CO3	L3	1,2,3,4,5
(b)	Using stop and wait protocol, sender wants to transmit 10 data packets to the receiver. Out of these 10 data packets, every 4th data packet is lost. How many packets sender will have to send in total?	[5M]	CO3	L3	1,2,3,4,5
12	List out random access protocols. Explain ALOHA.	[10M]	CO3	L2	1,2,3,4,5
	UNIT-IV	**Marks**	**CO**	**BL**	**PO**
1	Explain the functionalities of Network layer.	[10M]	CO4	L2	1,2,3,4,5
2	Explain about various class full IP Addressing.	[10M]	CO4	L2	1,2,3,4,5
3	Distinguish between IPV4 and IPV6.	[10M]	CO4	L2	1,2,3,4,5
4	Explain various fields in IPv4 header.	[10M]	CO4	L3	1,2,3,4,5
5	Distinguish between ARP and RARP.	[10M]	CO4	L4	1,2,3,4,5
6	Distinguish between BOOTP and DHCP.	[10M]	CO4	L4	1,2,3,4,5
7	Illustrate shortest path routing algorithm with suitable example.	[10M]	CO4	L2	1,2,3,4,5
8(a)	Classify routing algorithms.	[5M]	CO4	L2	1,2,3,4,5

(b)	Explain the concept of flooding.	[5M]	CO4	L2	1,2,3,4,5
9	Define switching. Explain various switching techniques.	[10M]	CO4	L2	1,2,3,4,5
10(a)	Distinguish between Broadcast and Multicast routing.	[5M]	CO4	L4	1,2,3,4,5
(b)	Explain briefly about Hierarchical routing.	[5M]	CO4	L2	1,2,3,4,5
11	Describe briefly about distance vector routing.	[10M]	CO4	L2	1,2,3,4,5
12(a)	Differences between Static and Dynamic Routing algorithm.	[5M]	CO4	L4	1,2,3,4,5
(b)	Explain various ICMP error reporting messages.	[5M]	CO4	L2	1,2,3,4,5

UNIT-V		**Marks**	**CO**	**BL**	**PO**
1	Explain in detail about transport layer responsibilities.	[10M]	CO5	L2	1,2,3
2	List and Explain various flow control mechanisms in transport layer.	[10M]	CO5	L4	1,2,3
3(a)	Explain Congestion. What are the general principles of Congestion?	[5M]	CO5	L2	1,2,3
(b)	List different Transport layer protocols.	[5M]	CO5	L4	1,2,3
4	Explain in detail three way handshaking for connection establishment in TCP.	[10M]	CO5	L2	1,2,3
5(a)	List various services provided by Transport layer.	[5M]	CO5	L4	1,2,3
(b)	Draw the UDP header format and explain each field.	[5M]	CO5	L2	1,2,3
6(a)	Explain TCP congestion control.	[5M]	CO5	L2	1,2,3
(b)	Draw and explain each field in TCP segment.	[5M]	CO5	L2	1,2,3
7	Explain about TCP Header Format.	[10M]	CO5	L2	1,2,3
8(a)	Discuss in detail about TCP connection establishment and release.	[5M]	CO5	L3	1,2,3
(b)	Explain about Leaky Bucket algorithm.	[5M]	CO5	L2	1,2,3
9	Describe briefly about Leaky Bucket algorithm.	[10M]	CO5	L2	1,2,3

10	Write a short note on Quality of Service. Explain QoS improving techniques.	[10M]	CO5	L2	1,2,3
11	Describe briefly about Token Bucket algorithm.	[10M]	CO5	L2	1,2,3
12(a)	Summarize about TCP and UDP Protocols.	[5M]	CO5	L2	1,2,3
(b)	Explain in detail about Connection Management.	[5M]	CO5	L2	1,2,3

UNIT-VI		**Marks**	**CO**	**BL**	**PO**
1	Explain briefly about Domain Name Space (DNS).	[10M]	CO6	L2	1,2,3,4,5,12
2	Explain in detail about HTTP.	[10M]	CO6	L2	1,2,3,4,5,12
3	Explain briefly the services provided by application layer.	[10M]	CO6	L2	1,2,3,4,5,12
4(a)	Write a short note on Electronic mail.	[5M]	CO6	L2	1,2,3,4,5,12
(b)	Describe briefly about TELNET.	[5M]	CO6	L2	1,2,3,4,5,12
5	List and explain different protocols provided by Application Layer.	[10M]	CO6	L4	1,2,3,4,5,12
6(a)	Identify the purpose of DNS.	[5M]	CO6	L3	1,2,3,4,5,12
(b)	Identify the purpose of POP3.	[5M]	CO6	L3	1,2,3,4,5,12
7(a)	List different protocols provided by Application Layer.	[5M]	CO6	L4	1,2,3,4,5,12
(b)	Write a short note on SMTP.	[5M]	CO6	L2	1,2,3,4,5,12
8	Distinguish between SMTP and POP3.	[10M]	CO6	L4	1,2,3,4,5,12
9(a)	Explain the services provided by HTTP.	[5M]	CO6	L2	1,2,3,4,5,12
(b)	Describe briefly about TELNET.	[5M]	CO6	L2	1,2,3,4,5,12
10	Examine the functioning of FTP.	[10M]	CO6	L4	1,2,3,4,5,12
11(a)	Explain function of SMTP.	[5M]	CO6	L2	1,2,3,4,5,12
(b)	How DNS assigns domain names to IP addresses?	[5M]	CO6	L3	1,2,3,4,5,12

12	List various protocols used in email.	[10M]	CO6	L4	1,2,3,4,5,12