

Model Question Paper

Computer Networks

Time: 3 Hours(180 Minutes)

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.

Module -1			M	L	C
Q1	a.	What is Data Communication? With a neat diagram, explain the components of data communication.	7	L2	CO1
	b.	What is multiplexing? With a neat diagram, explain different types of multiplexing techniques.	7	L2	CO1
	c.	Explain Half Duplex and Full Duplex with respect to data communication with suitable scenarios.	6	L2	CO1
OR					
Q2	a.	With a neat diagram, explain TCP/IP protocol suite of computer networks.	7	L2	CO1
	b.	Define transmission impairments. Explain different causes of transmission impairment during signal transmission	7	L2	CO1
	c.	Explain briefly how encapsulation and decapsulation takes place in internet.	6	L2	CO1
Module- 2					
Q3	a.	Develop the CRC bits and the transmitted code word for the data word 1001 using the divisor 1011.	7	L3	CO2
	b.	Differentiate Pure and Slotted ALOHA (vulnerable time, efficiency, synchronization). Using Pure ALOHA, find frame time, vulnerable time, and collision-free condition for 200-bit frames on a 200-kbps channel.	7	L3	CO2
	c.	Illustrate Stop-and-Wait ARQ and construct the send/ack sequence for four frames when the second acknowledgment is lost.	6	L3	CO2
OR					
Q4	a.	Describe error-detecting codes. Construct the CRC code for the frame 1101011111 using the generator polynomial $G(x) = x^4 + x + 1$.	7	L3	CO2
	b.	Explain FSM for the Simple Protocol in data link control, explain its working, and apply it to show sender-receiver states for transmitting two frames over an error-free channel.	7	L3	CO2
	c.	Describe CSMA/CD and apply it to show the event sequence when three stations transmit at overlapping times, including collision detection and resolution.	6	L3	CO2
Module - 3					
Q5	a.	Apply the Bellman-Ford equation to illustrate how the Distance-Vector (DV) Routing protocol is used to find the shortest path between nodes in a network	7	L3	CO3

	b.	<i>network graph 1</i> Apply distance vector algorithm to above network graph 1 and discuss with an example to demonstrate the construction of least cost tree for source node A.	7	L3	CO3
	c.	Draw the IPv4 datagram format and apply it to an example to explain how data is transmitted.	6	L3	CO3
OR					
Q6	a.	Explain the working mechanism of the OSPF protocol and apply the link-state routing method to a sample network topology to determine the shortest path from a given source to all destinations	7	L3	CO3
	b.	<i>network graph 2</i> Apply Link State (Dijkstra) algorithm to above network graph 2 and discuss with an example to demonstrate the construction of least cost tree for source node A.	7	L3	CO3
	c.	Describe DHCP and apply it to demonstrate how devices get IP addresses in a network	6	L3	CO3
Module - 4					
Q7	a.	Illustrate the concept of Flow Control in the Transport Layer and how TCP implements the Sliding Window Protocol.	10	L3	CO4
	b.	Describe working of Connection-Oriented Transport Layer protocols with suitable examples.	10	L3	CO4
OR					
Q8	a.	Illustrate the process of Error Detection and Error Recovery at the Transport Layer.	10	L3	CO4
	b.	Discuss the causes of congestion in a network and explain TCP's congestion control techniques.	10	L3	CO4

Module - 5					
Q9	a.	Illustrate the steps of iterative communication using TCP sockets with the help of a diagram.	8	L3	CO5
	b.	Define and Compare persistent and non-persistent HTTP connections.	6	L3	CO5
	c.	Describe the purpose of each HTTP request method.	6	L3	CO5
OR					
Q10	a.	With the help of a diagram, identify and describe the functions of various components in e-mail architecture.	8	L3	CO5
	b.	Illustrate the process of DNS name resolution in TCP/IP with a diagram.	6	L3	CO5
	c.	Classify SSH components and explain how each contributes to secure communication.	6	L3	CO5
