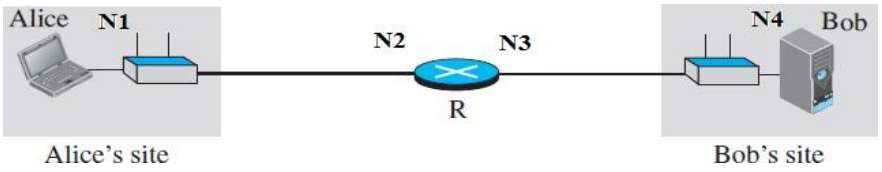
P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY		
BRANCH : Common to CSE & IT		**REGULATION : PVP20**
Course: B. Tech	**SUBJECT : Computer Networks**	
Subject Code: 20CS3503/20IT3503		**Year and Semester: III B.Tech – I Sem**
QUESTION BANK		

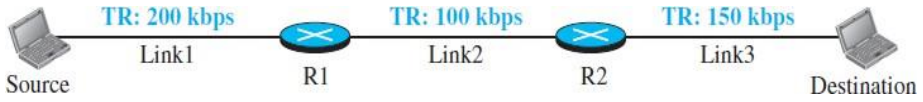
UNIT I

Q. NO.	QUESTION	CO	LEVEL
1 a)	Illustrate the differences and commonalities between the TCP/IP and OSI models.	CO1,CO2	L2
1 b)	What are the advantages of a multipoint connection over a point-to-point one? What are some of the factors that determine whether a communication system is a LAN or WAN?	CO1,CO2	L2
2	How are the layers of OSI model defined? With a neat diagram explain the functionalities of all the Layers.	CO1,CO2	L2
3 a)	There is no acknowledgment mechanism in CSMA/CD, but we need this mechanism in CSMA/CA. Explain the reason. What is the purpose of NAV in CSMA/CA?	CO1,CO2	L3
3 b)	DLL at a device has 3 one byte frames sent as a data stream by the physical layer; state any one mechanism that the DLL adapt at the senders end so that the receiving end can identify the frames from the received stream of data from physical layer. Illustrate the above scenario with a suitable example.	CO1,CO2	L3
4 a)	Make use of Cyclic Redundancy Check mechanism for the following data: Code word: 1001, Divisor: 1011 and check whether frame is transmitted successfully or not.	CO1,CO2	L3
4 b)	Identify the five components of a data communications system. What are the three criteria necessary for an effective and efficient network?	CO1,CO2	L2
5 a)	What is the function of the twisting in twisted-pair cable? Name the advantages of optical fiber over twisted-pair and coaxial cable.	CO1,CO2	L2
5 b)	What is ALOHA? Write various types of ALOHA? Apply G = ½ , G=1 for Slotted ALOHA and find out the effect of it on throughput.	CO1,CO2	L3
6 a)	Explain why collision is an issue in random access protocols but not in controlled access protocols.	CO1,CO2	L3
6 b)	Explain about unguided transmission media. Compare various unguided media.	CO1,CO2	L2
7 a)	Explain about Reservation and Polling mechanism in controlled access of Medium access.	CO1,CO2	L2
7 b)	How does a system know what the link-layer address of another system in a network using ARP? Using ARP, explain with a neat sketch depicting the flow activities at each node from Alice to Bob clearly	CO1,CO2	L3

	showing the logical addresses, link addresses and ARP request and reply packet fields, for the network shown below. Assumptions: • The protocol is IPv4 and the hardware is Ethernet • Let N1, N2, N3, & N4 be the Logical address. • Assume the Link address of Alice's, R & Bob's site as any Unicast Link Address  		
8 a)	For each of the following four networks, discuss the consequences if a connection fails. i) Five devices arranged in a mesh topology ii) Five devices arranged in a star topology (not counting the hub) iii) Five devices arranged in a bus topology iv) Five devices arranged in a ring topology	CO1,CO2	L3
8 b)	How does CSMA/CA avoid collisions? Explain it in detail.	CO1,CO2	L2
9	Explain the following with respect to TCP/IP Protocol Suite: i) Layers & Functionalities ii) Protocols iii) Data Units iv) Addressing mechanism of layers	CO1,CO2	L2
10 a)	Name the two major categories of transmission media. How do guided media differ from unguided media?	CO1,CO2	L2
10 b)	Explain why flags are needed when we use variable-size frames. Bit-stuff the following frame payload: `0001111111001111101000111111111110000111`	CO1,CO2	L2

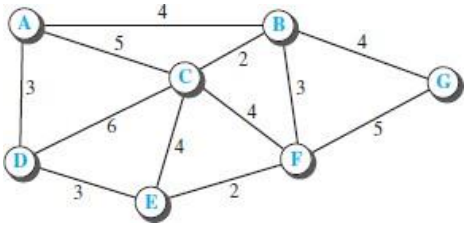
UNIT II

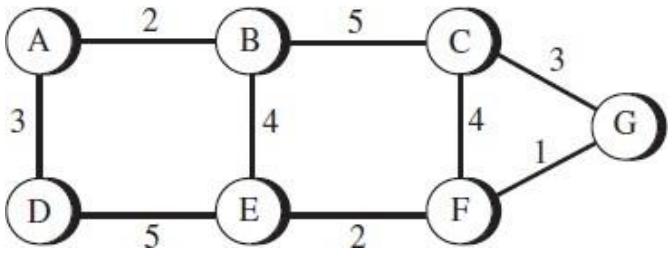
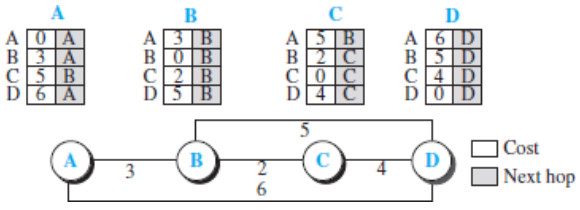
Q. NO.	QUESTION	CO	LEVEL
1 a)	Explain how DHCP can be used when the size of the block assigned to an organization is less than the number of hosts in the organization.	CO1,CO2, CO5	L3
1 b)	The CIDR notation of a IP address is as follows: 167.199.170.82/27 i) What type of address is the above (Host/network/broadcast)? ii) What is the network address? iii) What are the total numbers of hosts that can be connected in that	CO1,CO2, CO5	L3

	network? iv) What is the subnet mask? v) What is the broadcast address of that network?		
2 a)	Explain the advantages of IPv6 when compared to IPv4. How to represent IPv6 address in CIDR notation.	CO1,CO2, CO5	L2
2 b)	Illustrate how Packet Switching is used as a connectionless service with an example showing the forwarding/routing tables at each and every router.	CO1,CO2, CO5	L3
3 a)	List the three phases in the virtual-circuit approach to switching.	CO1,CO2, CO5	L2
3 b)	In the Figure, assume that the link between R1 and R2 is upgraded to 170 kbps and the link between the source host and R1 is now downgraded to 140 kbps. What is the throughput between the source and destination after these changes? Which link is the bottleneck now? 	CO1,CO2, CO5	L4
4 a)	Distinguish between the process of routing a packet from the source to the destination and the process of forwarding a packet at each router.	CO1,CO2, CO5	L3
4 b)	Both NAT and DHCP can solve the problem of a shortage of addresses in an organization, but by using different strategies. Justify the usage of each of these strategies.	CO1,CO2, CO5	L3
5 a)	Explain various kinds of delays during transmission in networks.	CO1,CO2, CO5	L2
5 b)	An ISP is granted the block 16.12.64.0/20. The ISP needs to allocate addresses for 8 organizations, each with 256 addresses. i) Find the number and range of addresses in the ISP block. ii) Find the range of addresses for each organization and the range of unallocated addresses. iii) Show the outline of the address distribution and the forwarding table.	CO1,CO2, CO5	L4
6 a)	Why is routing the responsibility of the network layer? In other words, why can't the routing be done at the transport layer or the data-link layer?	CO1,CO2, CO5	L4
6 b)	Compare datagram and virtual-circuit subnets.	CO1,CO2, CO5	L3
7 a)	What is congestion? What are the factors that cause congestion? Explain about various open loop congestion control mechanisms.	CO1,CO2, CO5	L2
7 b)	What is IPv6? Explain the structure of IPv6 Datagram. Compare and contrast the IPv4 header with the IPv6 header.	CO1,CO2, CO5	L3
8 a)	What are the various factors that affect the performance of network? How can we compute them?	CO1,CO2, CO5	L3
8 b)	Combine the following three blocks of addresses into a single block: i) 16.27.24.0/26 ii) 16.27.24.64/26 iii) 16.27.24.128/25	CO1,CO2, CO5	L3
9 a)	Differentiate between closed loop and open loop congestion control mechanisms.	CO1,CO2, CO5	L2

9 b)	Explain the types and address space of IPv6.	CO1,CO2, CO5	L2
10 a)	Explain the various services of Network layer?	CO1,CO2, CO5	L2
10 b)	An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets. i) Find the number of addresses in each subnet. ii) Find the subnet prefix. iii) Find the first and the last address in the first subnet. iv) Find the first and the last address in the last subnet.	CO1,CO2, CO5	L3

UNIT III

Q. NO.	QUESTION	CO	LEVEL
1 a)	When does an OSPF router send each of the following messages? i) hello ii) data description iii) link-state request iv) link-state update v) link-state acknowledgment	CO1,CO2, CO4, CO5	L3
1 b)	An IP datagram has arrived with the following partial information in the header (in hexadecimal): 45000054 00030000 2006... i) What is the header size? ii) Are there any options in the packet? iii) What is the size of the data? iv) Is the packet fragmented? v) How many more routers can the packet travel to? vi) What is the protocol number of the payload being carried by the packet?	CO1,CO2, CO4, CO5	L3
2 a)	Use Dijkstra's algorithm to find the shortest path tree and the forwarding table for node A in the Figure 	CO1,CO2, CO4, CO5	L3
2 b)	In an IPv4 datagram, the value of total-length field is (00A0)16 and the value of the header-length (HLEN) is (5)16. How many bytes of payload are being carried by the datagram? What is the efficiency (ratio of the payload length to the total length) of this datagram?	CO1,CO2, CO4, CO5	L3
3 a)	Which fields of the IPv4 main header may change from router to router?	CO1,CO2, CO4, CO5	L3
3 b)	Explain when each of the following attributes can be used in BGP: i) LOCAL-PREF ii) AS-PATH iii) NEXT-HOP	CO1,CO2, CO4, CO5	L2

4 a)	Briefly describe how we can defeat the following security attacks: i) packet sniffing ii) packet modification iii) IP spoofing	CO1,CO2, CO4, CO5	L3
4 b)	Explain the structure of BGP messages and their uses.	CO1,CO2, CO4, CO5	L2
5 a)	Calculate the distance vectors of every node during the iterations, for the given graph using Distance Vector Routing. 	CO1,CO2, CO4, CO5	L3
5 b)	Which field(s) in the datagram is(are) responsible for gluing together all fragments belonging to an original datagram? Explain with an example.	CO1,CO2, CO4, CO5	L3
6 a)	Is the path-vector routing algorithm closer to the distance-vector routing algorithm or to the link-state routing algorithm? Explain.	CO1,CO2, CO4, CO5	L3
6 b)	A 4000 byte IP datagram is divided into 3 fragments of 1400, 1400 & 1200 bytes each. Illustrate with a tidy diagram of IPv4 header depicting the values of each and every field used for fragmentation.	CO1,CO2, CO4, CO5	L3
7	Exaplain the various OSPF Meassage formats and OSPF Link state advertisements.	CO1,CO2, CO4, CO5	L2
8	In distance-vector routing, bad news (increase in a link metric) will propagate slowly. In other words, if a link distance increases, sometimes it takes a long time for all nodes to know the bad news. In Figure shown below, we assume that a four-node internet is stable, but suddenly the distance between nodes B and C, which is currently 2, is increased to infinity (link fails). Show how this bad news is propagated, and find the new distance vector for each node after stabilization. Assume that the implementation uses a periodic timer to trigger updates to neighbors (no more updates are triggered when there is change). Also assume that if a node receives a higher cost from the same previous neighbor, it uses the new cost because this means that the old advertisement is not valid anymore. To make the stabilization faster, the implementation also suspends a route when the next hop is not accessible. 	CO1,CO2, CO4, CO5	L4
9 a)	How does a Link State Routing algorithm create its LSDB and propagate them to other routers in the network. Explain.	CO1,CO2, CO4, CO5	L3
9 b)	Mention the limitations of Distance Vector and Link State routing algorithms.	CO1,CO2, CO4, CO5	L3

10 a)	An IP datagram has arrived with the following partial information in the header (in hexadecimal): 45000054 00030000 2006... show how checksum can be calculated from the wrapped sum using modular arithmetic.	CO1,CO2, CO4, CO5	L3
10 b)	Explain the operation of eBGP and iBGP? How does BGP perform address aggregation using the two protocols?	CO1,CO2, CO4, CO5	L2

UNIT IV

Q. NO.	QUESTION	CO	LEVEL
1 a)	Demonstrate how connection management is done in TCP	CO1,CO3, CO5	L3
1 b)	In a network with fixed value for m > 1, we can either use the Go-Back-N or the Selective-Repeat protocol. Describe the advantage and the disadvantage of using each. What other network criteria should be considered to select either of these protocols?	CO1,CO3, CO5	L4
2 a)	Explain the applications of TCP & UDP?	CO1,CO3, CO5	L2
2 b)	In the Go-Back-N protocol, the size of the send window can be 2m - 1, while the size of the receive window is only 1. How can flow control be accomplished.	CO1,CO3, CO5	L4
3 a)	Explain various services of Transport Layer.	CO1,CO3, CO5	L2
3 b)	The following is the content of UDP Header In Hexadecimal format CB84000D001C001C What is the source port no, Destination Port No, Total length of UDP Datagram, length of Data and the Client Process	CO1,CO3, CO5	L3
4 a)	If originally RTTS = 14 ms and α is set to 0.2, calculate the new RTTS after the following events (times are relative to event 1): Event 1: 00 ms Segment 1 was sent. Event 2: 06 ms Segment 2 was sent. Event 3: 16 ms Segment 1 was timed-out and resent. Event 4: 21 ms Segment 1 was acknowledged. Event 5: 23 ms Segment 2 was acknowledged.	CO1,CO3, CO5	L3
4 b)	The following is part of a TCP header dump (contents) in hexadecimal format. E293 0017 00000001 00000000 5002 07FF... i) What is the source port number? ii) What is the destination port number? iii) What is the sequence number? iv) What is the acknowledgment number? v) What is the length of the header? vi) What is the type of the segment? vii) What is the window size?	CO1,CO3, CO5	L3

5 a)	What is addressing? Explain addressing concept in transport layer.	CO1,CO3, CO5	L2
5 b)	In a TCP connection, the initial sequence number at the client site is 2171. The client opens the connection, sends three segments, the second of which carries 1000 bytes of data, and closes the connection. What is the value of the sequence number in each of the following segments sent by the client? i) The SYN segment ii) The data segment iii) The FIN segment	CO1,CO3, CO5	L3
6 a)	An HTTP client opens a TCP connection using an initial sequence number (ISN) of 14,534 and the ephemeral port number of 59,100. The server opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment if the client defines the rwnd of 4000 and the server defines the rwnd of 5000. Ignore the calculation of the checksum field.	CO1,CO3, CO5	L3
6 b)	Identify fields in TCP Header that are not present in UDP Header along with details and give reasons for the missing fields.	CO1,CO3, CO5	L3
7 a)	What are the different timers used by TCP.	CO1,CO3, CO5	L2
7 b)	An acknowledgment number in the Go-Back-N protocol defines the next packet expected, but an acknowledgment number in the Selective-Repeat protocol defines the sequence number of the packet to be acknowledged. Can you explain the reason?	CO1,CO3, CO5	L3
8 a)	Compare TCP & UDP.	CO1,CO3, CO5	L2
8 b)	Suppose a TCP connection is transferring a file of 5000 bytes. The first byte is numbered 10001. What are the sequence numbers for each segment if data are sent in five segments, each carrying 1000 bytes? Demonstrate the above scenario using Flow diagram showing the Sequence Numbers, Acknowledgement Numbers, & Flags.	CO1,CO3, CO5	L3
9	In a network using the Selective-Repeat protocol with m = 4 and the sending window of size 8, the value of variables are Sf = 62, Sn = 67, and Rn = 64. Packet 65 has already been acknowledged at the sender site; packets 65 and 66 are received out-of-order at the receiver site. Assume that the network does not duplicate the packets. i) What are the sequence numbers of pending data packets (in transit, corrupted, or lost)? ii) What are the acknowledgment numbers of pending ACK packets (in transit, corrupted, or lost)?	CO1,CO3, CO5	L4
10 a)	Can you explain why we need four (or sometimes three) segments for connection termination in TCP?	CO1,CO3, CO5	L3
10 b)	The ssthresh value for a Taho TCP station is set to 6 MSS. The station now is in the slow-start state with cwnd = 4 MSS. Show the values of cwnd, sstresh, and the state of the station before and after each of following events: four consecutive nonduplicate ACKs arrived followed	CO1,CO3, CO5	L3

	by a time-out, and followed by three nonduplicate ACKs.		

UNIT V

Q. NO.	QUESTION	CO	LEVEL
1 a)	Summarize about Request and Response message formats in HTTP along with an example for each.	CO1,CO3	L2
1 b)	In DNS, which of the following are FQDNs and which are PQDNs? Give few examples of each.	CO1,CO3	L3
2 a)	Explain about Non-persistent versus Persistent Connections in HTTP.	CO1,CO3	L2
2 b)	In FTP, Assume a client with user name john needs to store a video clip called Video2 on the directory /top/videos/general on the server. Show the commands and responses exchanged between the client and the server if the client chooses ephemeral port number 56002.	CO1,CO3	L3
3 a)	What are cookies? Explain the process of Creating and Storing Cookies?	CO1,CO3	L2
3 b)	What role does the DNS resolver play in the DNS system? What are the various resolution mechanisms?	CO1,CO3	L2
4 a)	Explain about the concept of web caching & proxy servers.	CO1,CO3	L2
4 b)	Explain about Control connection and data connection in FTP.	CO1,CO3	L2
5 a)	Show your understanding about components of Secure Shell (SSH).	CO1,CO3	L2
5 b)	Explain about SMTP Protocol & mail transfer phases.	CO1,CO3	L2
6 a)	Explain about local v/s remote login and NVT in detail of TELNET.	CO1,CO3	L2
6 b)	Illustrate Electronic Mail Architecture in detail.	CO1,CO3	L2
7 a)	Explain the concept of MIME in email transfer.	CO1,CO3	L2
7 b)	Explain about name space and hierarchy of Name servers in DNS.	CO1,CO3	L2
8 a)	Exaplain about web based email and email security.	CO1,CO3	L2
8 b)	Explain about DNS in Internet?	CO1,CO3	L2
9 a)	Explain the basic model & concept of FTP in detail	CO1,CO3	L2

9 b)	Explain about the following in DNS i) Caching ii) Resource Records iii) DNS Message Format	CO1,CO3	L2
10 a)	Write short notes on e-mail services of the application layer.	CO1,CO3	L2
10 b)	Explain the applications of SSH.	CO1,CO3	L2

Course Coordinators