COURSE CODE 21CS45

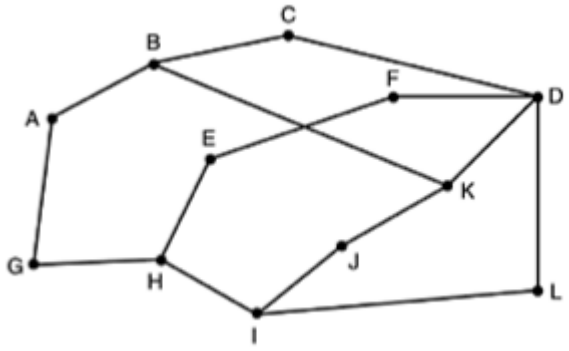
USN

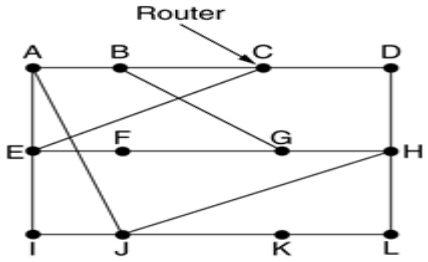
RV COLLEGE OF ENGINEERING®
Autonomous Institution affiliated to VTU
IV Semester B. E. Oct/Nov 2022 Examinations
DEPARTMENT COMPUTER SCIENCE AND ENGINEERING
COURSE TITLE: COMPUTER NETWORKS

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

		PART-A	Marks	BT
1	1.1	The functionalities of the presentation layer include _____	01	2
	1.2	For a 10Mbps Ethernet link, if the length of the packet is 32bits, the transmission delay is _____ (in microseconds)	02	4
	1.3	In OSI model, when data is sent from device A to device B, the 5th layer to receive data at B is _____	01	2
	1.4	Assuming a framing protocol that uses bit stuffing, show the bit sequence transmitted over the link when a frame contains following bit sequence: 11010111110010111111010111101. Mark the stuffed bits.	01	5
	1.5	Compute a multicast spanning tree for router C in the following subnet for a group with members at routers A, B, C, D, E, F, I, and K. 	02	5
	1.6	CPU in a router can process at 2 Mbps. Load offered to it is 1.5 Mbps. Compute the total packet delay if the route from source to destination contains 10 Routers.	01	3
	1.7	An endpoint of an inter-process communication flow across a computer network is called__	01	2
	1.8	In _____ routing algorithm, each router exchanges routing information with its neighbors.	01	3
	1.9	A 4 byte IP address consists of ___ and ___	01	4
	1.10	A general class of routing algorithms, known as _____ algorithms, change their routing decisions based on changes in network topology and network traffic.	01	1
	1.11	E-mail service is implemented using _____ protocol.	01	2

	1.12	Define the term Jitter.	01	1
	1.13	The entire hostname has a maximum of _____characters	01	3
	1.14	For hierarchical routing with 4800 routers, what region & cluster sizes should be chosen to minimize the size of routing table for a 3-layer hierarchy?	01	3
	1.15	FTP uses _____ parallel TCP connections to transfer a file.	01	3
	1.16	If TELNET is using character mode, how many characters are sent back and forth between the client and server to copy a file named file1 to another file named file2 using the command : cp file1 file2 ?	01	4
	1.17	The set of optimal routes from all sources to a given destination form a _____ rooted at the destination.	01	1
	1.18	Case1: Supercomputer trying FTP to PC at 1 Gbps Case2: Store-and forward network with 1 Mbps lines, 1000 large computers, 500 computers are trying FTP at 100 Kbps each to the other 500 computers. For the above two scenarios analyze Flow control, Congestion Control.	01	5
		PART-B		
2	a	Draw and explain TCP/IP protocol suite in detail.	08	2
	b	A system has five-layer protocol hierarchy. Applications generate messages of length 10 bytes. At each of the layers, 5-byte header is added. What fraction of the network band-width is filled with headers.	04	5
	c	Demonstrate the concept of piggybacking and error handling while using HDLC frame.	04	4
3	a	Differentiate between connection oriented service and connectionless service used to implement network layer.	08	2
	b	Consider the following two cases : (i)a VC service implementation using 3-byte header and 8 bytes of storage for VCid (ii) a datagram implementation service using 15-byte header The average duration of a session is 1000 seconds during which 200 packets are transmitted. The average no. of hops is 4. Assume : (i) cost of transmission capacity is 0.5 paisa per 106 bytes per hop (ii) cost of router memory is 0.5 paisa per byte and depreciates in 2 years @ 40 hours per week Compute and compare the cost of overheads in the above two implementations (VC and datagram) for the given set of parameters	08	5
		OR		
4	a	Discuss different method used to implement Broadcast routing	08	3
	b	Using Distance Victor Routing, design routing tables for following Subnet  	08	1
5	a	Explain working principle of Differentiated service and Integrated service.	08	2

	b	How congestion control is implemented in Datagram networks?	08	3
		OR		
6	a	Describe the techniques for achieving Good Quality of Service.	8	2
	b	Explain the concept of Load Shedding and Jitter with suitable examples.	8	3
7	a	Suppose that host A is connected to a router R 1, R 1 is connected to another router, R 2, and R 2 is connected to host B. Suppose that a TCP message that contains 900 bytes of data and 20 bytes of TCP header is passed to the IP code at host A for delivery to B. Show the Total length, Identification, DF, MF, and Fragment offset fields of the IP header in each packet transmitted over the three links. Assume that link A-R1 can support a maximum frame size of 1024 bytes including a 14-byte frame header, link R1-R2 can support a maximum frame size of 512 bytes, including an 8-byte frame header, and link R2-B can support a maximum frame size of 512 bytes including a 12byte frame header.	08	5
	b	What is Tunneling? Briefly explain how Tunneling is used to implement internetworking?	08	4
		OR		
8	a	A large no. of consecutive IP addresses are available starting at 198.16.0.0 Organizations A, B request for the following no. of addresses (in that order) A 4000 B 2000 For each of A, B give : (a) IP address range (b) mask	08	5
	b	Write in detail how Exterior Gateway Routing Protocol are used to implement Internetworking.	08	3
9	a	The following is a partial dump of a TCP header in hexadecimal format : 05320017 00000001 00000000 500207FF 00000000 (i) What is the source port number? (ii) What is the application being used? (iii) What is the sequence number? (iv) What is the ack number?	08	2
	b	With a neat diagram, explain the RTP header in detail.	08	2
		OR		
10	a	With the help of a neat diagram, explain the fields of TCP header.	08	2
	b	Explain the process of TCP connection establishment and TCP connection Release	08	2