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**RV COLLEGE OF ENGINEERING®**

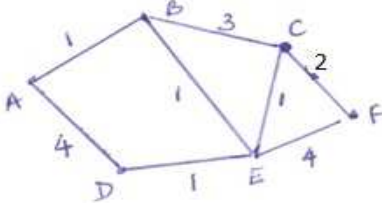
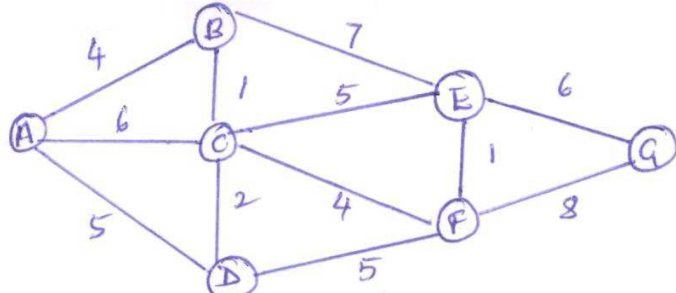
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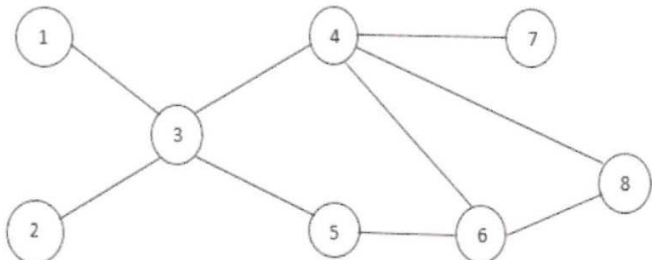

IV Semester B. E. Grade Improvement Examinations Nov-2021

**Computer Science and Engineering****COMPUTER NETWORKS***Time: 03 Hours**Maximum Marks: 100**Instructions to candidates:*

Answer any FIVE full questions out of TEN. Each carries 20 marks.

1	1.1	Differentiate between error control and flow control techniques.	02
	1.2	Mention the layers that perform these tasks: i. Route determination ii. Flow control iii. Providing user services iv. Defining frames.	02
	1.3	When data are transmitted from device A to device B, the header from A's layer 4 is read by B's _____ layer.	01
	1.4	Define piggybacking and its benefits.	02
	1.5	15 machines are to be connected in a LAN using 8 ports Ethernet switches. Assuming the switches doesn't have any separate port for uplink; minimum number of switches needed is _____.	01
	1.6	Discuss why does the link-state advertisement include a sequence number?	02
	1.7	In _____ transmission, the channel capacity is shared by both communicating devices at all times.	01
	1.8	In transition phase of PPP protocol, term that refers to start of communication is _____.	01
	1.9	_____ sublayer of the data link layer performs data link functions that depend upon the type of medium.	01
	1.10	Term that refers to a set of procedures used to restrict amount of data that sender can send before waiting for acknowledgement.	01
	1.11	High-level Data Link Control (HDLC) is a _____ protocol for communication over point-to-point and multipoint links.	01
	1.12	In Carrier Sense Multiple Access (CSMA), possibility of collision still exists because of _____.	01
	1.13	Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. Discuss the transport and application layer protocols besides HTTP that are needed in this scenario.	02
	1.14	Abbreviate the IPv6 address <i>FDEC:0074:0000:0000:0000:B0FF:0000:FFF0</i>	01
	1.15	In a telephonic communication (connection oriented) if user1 and user2 are communicating and user1 calls user2, who is making active open and who is making passive open in this case?	01
2	a	Define protocol. With a neat diagram, explain logical connection between layers of the <i>TCP/IP</i> protocol suite.	06
	b	Explain various types of addresses used to achieve network communication. Mention their structure with suitable example.	06
	c	List the data link control functions. Discuss the importance of framing. With neat diagrams, explain different types of framing.	08

3	a	List the three types of HDLC frames used in the HDLC bit oriented protocol. Explain the significance of each of the frames along with its structure. Also show how the frames can be used for exchange of data using piggybacking.	10
	b	With neat flow diagram, explain the working of CSMA/CD.	10
4	a	Compare and contrast Link State and Distance vector Routing algorithms.	06
	b	Apply Bellman-Ford algorithm to the network shown in Fig 4b.	
		 <p>Fig 4b</p> <p>Provide the new routing table for node B that consist of best outgoing line and cost, when it receives the vectors from A: (0,1,4,4,2,5), E: (5,1,1,1,0,4) and C: (4,3,0,2,1,2).</p>	08
	c	Define routing. Explain the structure of the router.	06
5	a	For the network given in Fig 5a, give the datagram forwarding table for each node. The links are labeled with relative costs; prepare table that forwards each packet via the lowest-cost path to its destination.	
		 <p>Fig 5a</p>	12
	b	Differentiate between the following: i. Broadcast routing and multicast routing ii. Connection oriented and connectionless service.	08
6	a	Define congestion. Discuss various approaches to control congestion in Internet.	08
	b	Consider a network in which mean arrival rate of packets is 950000pkts/sec, mean processing capacity of router is 1 million packets/sec. Assuming the router is handling multiple flows, compute i. CPU utilization of the router ii. Mean delay experienced by each packets iii. If there are 30 routers along the route flow, what is queuing delay?	06
	c	Compare and contrast leaky bucket and token bucket algorithms.	06
7	a	Describe how internetworking happens with tunneling. Mention its advantages and disadvantages.	06
	b	Interpret why IPv4 has fragment reassembly done at the endpoint rather than at the next router and illustrate how IPv6 handles the fragmentation entirely?	06
	c	Distinguish between integrated and differentiated services. Describe the scheme of assured forwarding with relevant diagram.	08

8	a	<p>State the purpose of TTL field in an IPv4 packet and its operating principle. Consider the subnet shown in Fig 8a.</p>  <p style="text-align: center;">Fig 8a</p> <ol style="list-style-type: none"> <li>If there is a packet originating at Router 1, what should be the minimum TTL value to reach Routers 2, 6, 8 respectively?</li> <li>Packet originating at Router 1 destined to Router 7 has TTL=3. Identify the sequence of operations taking place.</li> <li>What is the significance of header checksum field?</li> <li>If most of the fields are intact in the IPv4 header, then why header checksum is computed at each router?</li> </ol>	10
	b	<p>Consider the network setup shown in Fig 8b. Assuming ISP assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1.0/24.</p>  <p style="text-align: center;">Fig 8b</p> <ol style="list-style-type: none"> <li>Assign addresses to all interfaces in the home network.</li> <li>Suppose each host has an ongoing TCP connections, all to port 80 at host 128.119.40.86, provide the six corresponding entries in the NAT translation table.</li> <li>Determine the class of address assigned by the ISP.</li> <li>If a new device is assigned to the network, how does the device obtain a new IP address?</li> </ol>	10
9	a	Discuss any three services provided by the transport layer.	08
	b	<p>Consider the NAT translation table and the configuration shown in Fig 9b. The ISP assigns router address 124.132.112.235. The private address to the home network is 192.168.1/24. With these requirements, perform the following:</p> <ol style="list-style-type: none"> <li>Assign address to all interfaces in the home network</li> <li>Redraw the network diagram considering the address.</li> <li>Suppose each host has two ongoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six corresponding entries in the NAT translation table.</li> </ol>	

NAT translation table	
WAN side	LAN side
138.76.29.7, 5001	10.0.0.1, 3345
...	...

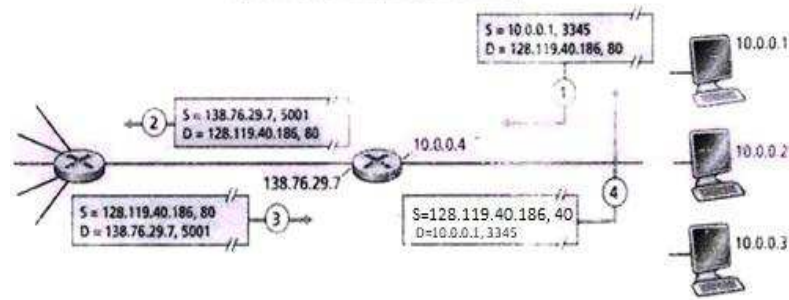


Fig 9b

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- 10 a Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence number 90; the second has a sequence number 110. With the appropriate timing diagram, answer the following:
- Analyze how much data is in the first segment?
  - Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgement that Host B sends to Host A, what will be the acknowledgement number?
- b List the multiple timers used by TCP. Explain the significance of each.
- c Mention various HTTP methods and their usages in real time applications. Discuss how the method is used in the applications.

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