Register Number															

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

Set - D

College of Engineering and Technology

School of Computing

Academic Year: 2021-22 (Even)

Test	**:** CLA-T3	**Date**	**:** 24-06-2022
Course Code & Title	**:** 18CSS202J - Computer Communications	**Duration**	**:** 100 Minutes (2 Periods)
Year & Sem	**:** II Year / IV Sem	**Max Marks**	**:** 50

Course Articulation Matrix:

S.No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	CO1	3	-	-	-	-	-	-	-	-	-	-	3
2	CO2	3	2	3	-	-	-	-	-	-	-	-	3
3	CO3	3	3	3	-	-	-	-	-	-	-	-	3
4	CO4	3	2	-	-	-	-	-	-	-	-	-	3
5	CO5	3	-	-	-	-	-	-	-	-	-	-	2
6	CO6	3	3	3	-	-	-	-	-	-	-	-	3

Part – A (20 x 1 = 20 Marks)

Instructions: 1) Answer ALL questions. 2) The duration for answering the part A is 30 minutes (this sheet will be collected after 30 minutes). 3) Encircle the correct answer 4) # denotes the type of the question is "fill in the blank"

Q. No	Question	Marks	BL	CO	PO	PI Code
1	The data link layer adds _____ address to the frame to identify the sender and receiver. A. logical B. port C. physical D. network	1	1	4	1	1.7.1
2	The sender's window in a sliding window protocol expands when _____. A. an ACK is received B. an ACK is sent C. a frame is sent D. a frame is received	1	1	4	1	1.7.1
3	A sender has a sliding window of size 15. The first 15 frames are sent. The receiver sends an ACK 10 and expands its window. What is the size of the receiver window now? A. 5 B. 9 C. 10 D. 15	1	3	4	2	2.6.3
4	The stop-and-wait flow control method is the same as the sliding window method with a window size of _____. A. 0 B. 1 C. 2 D. 4	1	2	4	2	2.6.3
5	In _____ framing, there is no need for defining the boundaries of frames. A. fixed-size B. variable-size C. standard-size D. small-size	1	2	4	1	1.7.1
6	The _____ Protocol has flow control, but not error control A. Stop-and-Wait B. Simplest C. Go-Back-N ARQ D. Selective-Repeat ARQ	1	1	4	1	1.7.1

7	A simple parity-check code can detect _____ errors A. an even-number of B. two C. no errors D. an odd-number of	1	2	4	2	2.6.3
8	In block coding, if n = 5, the maximum Hamming distance between two codewords is A. 2 B. 3 C. 5 D. 4	1	3	4	2	2.6.3
9	In _____, the chance of collision can be reduced if a station senses the medium before trying to use it. A. MA B. CSMA C. FDMA D. CDMA	1	1	4	1	1.7.1
10	In HDLC there are _____ modes of data transfer operations. A. Three B. One C. Two D. Four	1	1	4	1	1.7.1
11#	OSPF stands for _____ **Open Shortest Path First**	1	1	6	1	1.7.1
12	In _____ forwarding, the routing table holds the address of just the next hop instead of complete route information. A. next-hop B. network-specific C. host-specific D. default	1	1	6	1	1.7.1
13	For purposes of routing, the Internet is divided into _____. A. wide area networks B. autonomous networks C. autonomous systems D. local area networks	1	1	6	1	1.7.1
14	In _____ routing, the least cost route between any two nodes is the route with the minimum distance. A. path vector B. distance vector C. link state D. vector	1	1	6	1	1.7.1
15	In OSPF, a _____ link is a network with several routers attached to it. A) point-to-point B) transient C) stub D. default	1	1	6	1	1.7.1
16	Which protocol should you select if the network diameter is more than 17 hops? A. RIPv1 B. RIPv2 C. EIGRP D. OSPF	1	1	6	1	1.7.1
17	EIGRP uses the _____ algorithm for finding shortest path. A. SPF B. DUAL C. Linkstat D. Djikstra's	1	1	6	1	1.7.1
18	Which state indicates that the router does not have a path to the neighbor IP address? A. active B. idle C. established D. open confirm	1	1	6	1	1.7.1
19	In distance vector routing algorithm, the routing tables are updated _____. A. by exchanging information with the neighbors B. automatically C. using the backup database D. by the server	1	1	6	1	1.7.1
20	What protocol does OSPF use? A. TCP number 89 B. UDP number 88 C. UDP number 89 D. IP number 89	1	1	6	1	1.7.1

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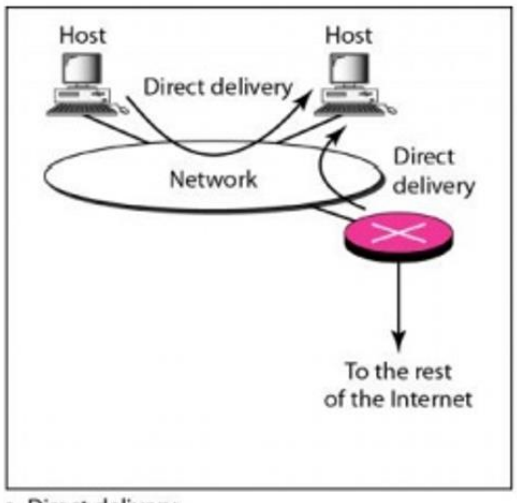
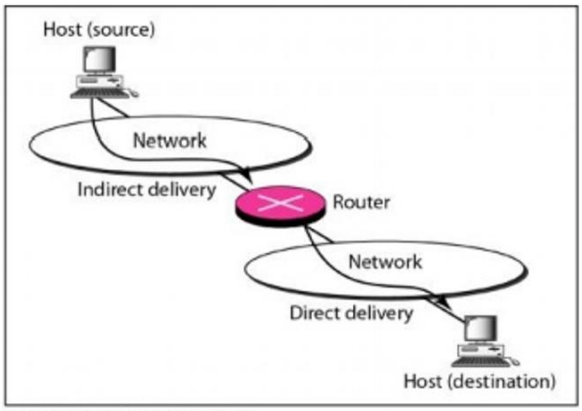
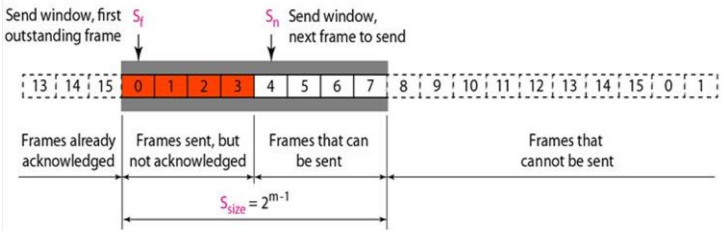
Part – B (2 x 5 = 10 Marks)

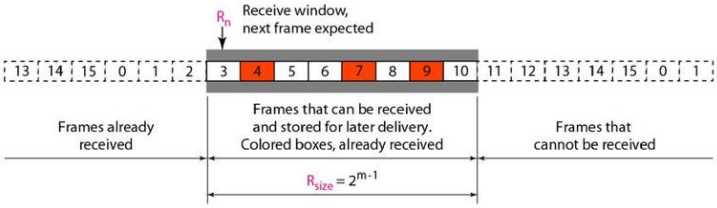
Instructions: Answer ALL questions

Q. No	Question	Marks	BL	CO	PO	PI Code
21	Compare and contrast the Go-Back-N ARQ Protocol with Selective-Repeat-ARQ. **Answer:** ✓ In the Go-Back-N ARQ Protocol, we can send several frames before receiving acknowledgments. If a frame is lost or damaged, all outstanding frames sent before that frame are resent. ✓ In the Selective- Repeat ARQ protocol we avoid unnecessary transmission by sending only the frames that are corrupted or missing. ✓ Both Go-Back-N and Selective-Repeat Protocols use sliding windows. ✓ In Go-Back-N ARQ, if m is the number of bits for the sequence number, then the size of the send window must be at most 2^{m-1}; the size of the receiver window is always 1. ✓ In Selective-Repeat ARQ, the size of the sender and receiver window must be at most 2^{m-1}.	5	2	4	1	1.7.1
22	Explain the direct and an indirect delivery with suitable diagram? **Answer:** ✓ In a direct delivery, the final destination of the packet is a host connected to the same physical network as the deliverer.  a. Direct delivery	5	1	4	1	1.7.1

	✓ In an indirect delivery the packet goes from router to router until it reaches the one connected to the same physical network as its final destination.  b. Indirect and direct delivery					

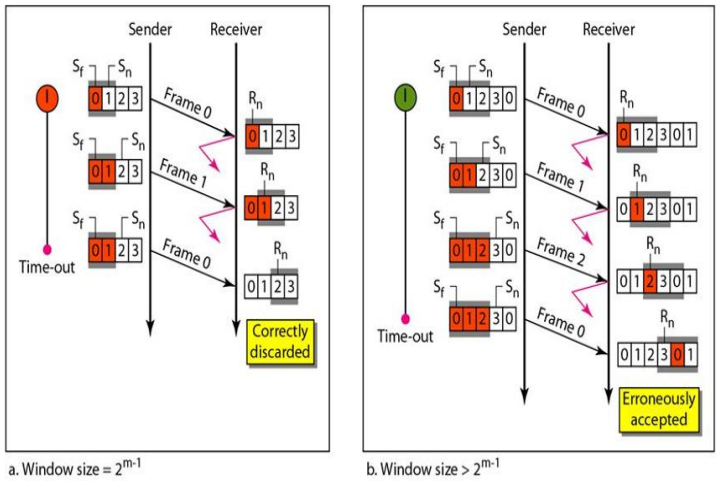
Part – C (2 x 10 = 20 Marks) Instructions: Answer ALL questions						
Q. No	**Question**	**Marks**	**BL**	**CO**	**PO**	**PI Code**
23. A	Illustrate the design mechanism for Selective Repeat Automatic Repeat Request and explain in detail with example. **Answer:** ✓ It is more efficient for noisy links, but the processing at the receiver is more complex. ✓ **Windows:** The Selective Repeat Protocol also uses two windows: a send window and a receive window. However, there are differences between the windows in this protocol and the ones in Go-Back-N. ✓ First, the size of the send window is much smaller; it is 2^{m-1}. Second, the receive window is the same size as the send window. ✓ The send window maximum size can be 2^{m-1}. ✓ For example, if m = 4, the sequence numbers go from 0 to 15, but the size of the window is just 8 (it is 15 in the Go-Back-N Protocol). ✓ The smaller window size means less efficiency in filling the pipe, but the fact that there are fewer duplicate frames can compensate for this. The protocol uses the same variables as we discussed for Go-Back-N. We show the Selective Repeat send window in the below figure to emphasize the size. ✓  **Send window for Selective RepeatARQ** ✓ The receive window in Selective Repeat is totally different from the one in GoBack-N. ✓ First, the size of the receive window is the same as the size of the send window 2^{m-1}.	10	2	4	1	1.7.1

- ✓ The Selective Repeat Protocol allows as many frames as the size of the receive window to arrive out of order and be kept until there is a set of in-order frames to be delivered to the network layer.
- ✓ Because the sizes of the send window and receive window are the same, all the frames in the send frame can arrive out of order and be stored until they can be delivered.
- ✓ We need, however, to mention that the receiver never delivers packets out of order to the network layer. Below figure shows the receive window in this protocol



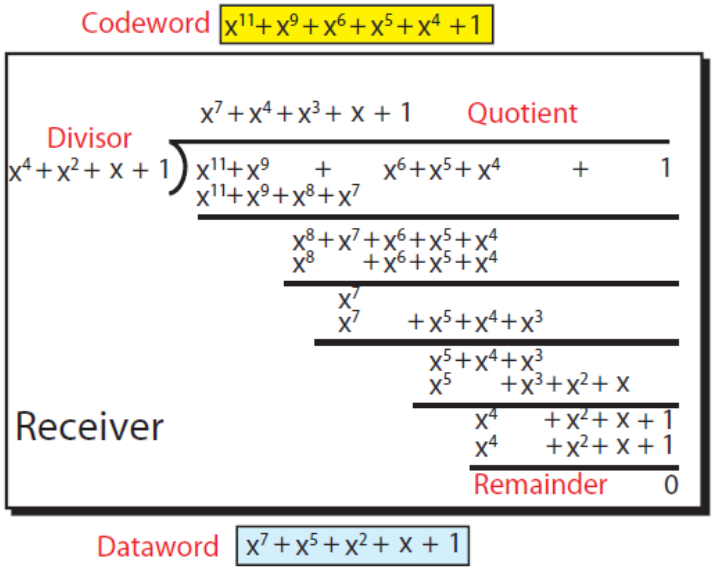
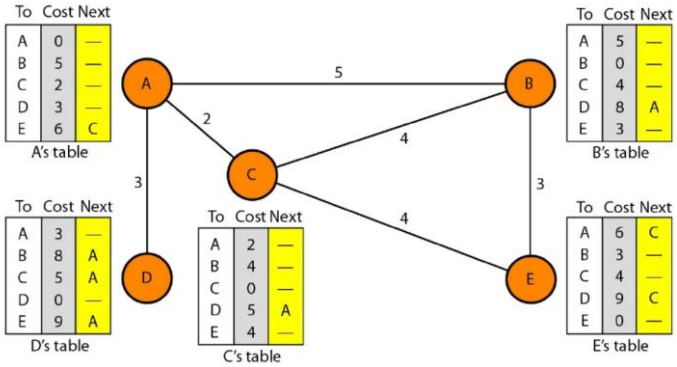
Receive window for Selective Repeat ARQ

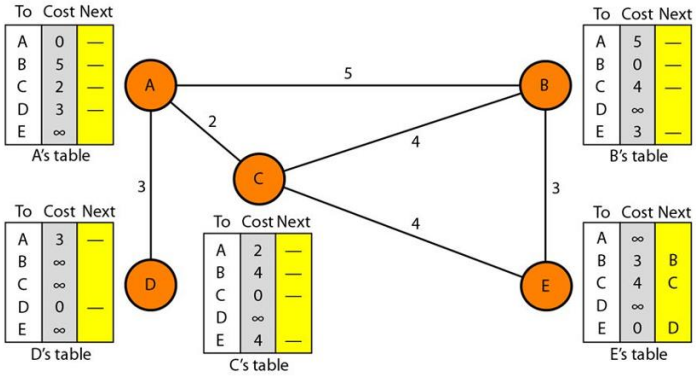
- ✓ Below figure compares a window size of 2 with a window size of 3.
- ✓ If the size of the window is 2 and all acknowledgments are lost, the timer for frame 0 expires and frame 0 is resent.
- ✓ However, the window of the receiver is now expecting frame 2, not frame 0, so this duplicate frame is correctly discarded.
- ✓



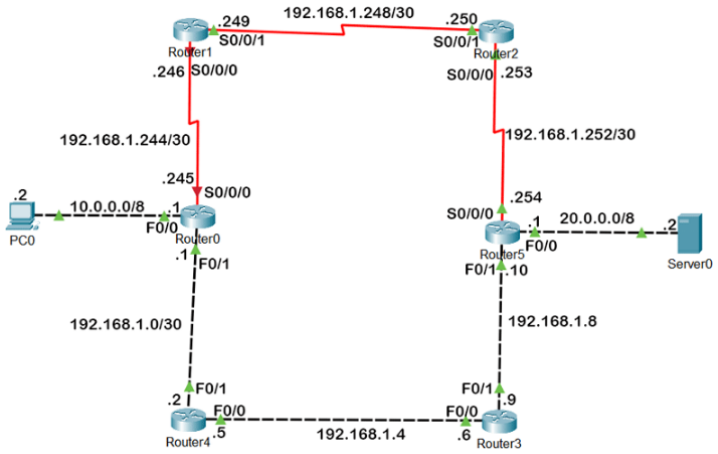
- ✓ When the size of the window is 3 and all acknowledgments are lost, the sender sends a duplicate of frame 0.
- ✓ However, this time, the window of the receiver expects to receive frame 0 (0 is part of the window), so it accepts frame 0, not as a duplicate, but as the first frame in the next cycle.
- ✓ This is clearly an error.

Or

23. B.i.	Assuming even parity, find the parity bit for the data unit 1 1 1 0 1 1 1 	Dataword	Number of 1s	Parity	Codeword
---	---	---	---
1110111	6 (even)	0	01110111		2	3	4	2	2.6.3
23. B.ii.	Given the codeword polynomial $x^{11} + x^9 + x^6 + x^5 + x^4 + 1$ and the divisor polynomial $x^4 + x^2 + x + 1$, Show the generation of the dataword polynomial at the receiver site (using binary division and assume no error). **Answer:**  	8	3	4	2	2.6.3
24. A	Demonstrate the distance vector protocol with example. **Answer:** ✓ In distance vector routing, the least-cost route between any two nodes is the route with minimum distance. ✓ In this protocol, as the name implies, each node maintains a vector (table) of minimum distances to every node. ✓ The table at each node also guides the packets to the desired node by showing the next stop in the route (next-hop routing). ✓ In the below figure, we show a system of five nodes with their corresponding tables  ✓ The table for node A shows how we can reach any node from this node. For example, our least cost to reach node E is 6. The route passes through C.	10	2	6	1	1.7.1

	✓ ***Initialization*** ✓ The tables in Figure 22.14 are stable; each node knows how to reach any other node and the cost. ✓ At the beginning, however, this is not the case. Each node can know only the distance between itself and its immediate neighbors, those directly connected to it. ✓ So, for the moment, we assume that each node can send a message to the immediate neighbors and find the distance between itself and these neighbors  ***Initialization of tables in distance vector routing*** ✓ The above figure shows the initial tables for each node. ✓ The distance for any entry that is not a neighbor is marked as infinite (unreachable). ✓ **Sharing:** The whole idea of distance vector routing is the sharing of information between neighbors. ✓ *In distance vector routing, each node shares its routing table with its immediate neighbors periodically and when there is a change* ✓ ***Updating:*** When a node receives a two-column table from a neighbor, it needs to update its routing table					
	Or					
24. B	Explain in detail about the Enhanced Interior Gateway Routing Protocol with example. ✓ Enhanced Interior Gateway Routing Protocol is an advanced distance vector routing protocol based on the principles of the Interior Gateway Routing Protocol (IGRP). ✓ It has a unique characteristic that improves the operational ability and fast converging rate. It can determine the shortest path distance vector, and it works on the principle of Interior Gateway Routing Protocol, a classless routing protocol. ✓ It uses metrics like bandwidth, load and delays to calculate the shortest optimal network route. ✓ It is a technologically, more advanced distance vector-based routing protocol. ✓ To exchange information using EIGRP, first and foremost, the routers need to become neighbors to EIGRP, then EIGRP uses the multicast address to share the information. ✓ To perform the functions of EIGRP, it creates three tables which are: 1. Neighbor Table 2. Topology Table 3. Routing Table	10	1	6	1	1.7.1

- ✓ **Neighbor Table:**
- ✓ The neighbor table contains information about routers and neighborship relationships with those whom have been established.
- ✓ Command to list router information: 'show ip eigrp neighbors'.
- ✓ The Neighbor Table has Fields like H: Handle, Address, Interface, Hold Time, Uptime, Smooth Round Trip Time, Retransmission Timeout, Queue Count, Sequence Number.
- ✓ **Topology Table:**
- ✓ The topology table holds information about all the paths to networks understood by EIGRP routers.
- ✓ Command to list router information- 'show ip eigrp' topology.
- ✓ The topology table holds the following fields Passive, Feasible Distance, Advertised distance, Feasible distance
- ✓ **Routing Table:**
- ✓ The routing table stores the routes which are currently active in sending packets to the network. It stores the optimal route for the destination from the sender.
- ✓ Command to List Router Information: 'show ipv6 route'.
- ✓ The routing table holds the following fields D, 90/ 5632. Via 11.0.0.2, GigabitEthernet0/1.
- ✓ **Example:**



- ✓ The following commands configure and enable EIGRP on Router0.

```
Router(config)#router eigrp 20
Router(config-router)#network 10.0.0.0 0.0.0.255
Router(config-router)#network 192.168.1.244 0.0.0.3
Router(config-router)#network 192.168.1.0 0.0.0.3
```

- ✓ The first command enables EIGRP with the AS number 20. Since we used the AS number 20 on this router, this router will share routing information only with the routers that belong to the AS number 20.
- ✓ The second command adds the network 10.0.0.0 255.0.0.0 to the EIGRP operation.
- ✓ The subnet mask of the network 10.0.0.0/8 is 255.0.0.0.
- ✓ To calculate the wildcard mask for this subnet mask, we subtracted if from 255.255.255.255.
- ✓ Router 1

```
Router(config)#router eigrp 20
Router(config-router)#network 192.168.1.244 0.0.0.3
Router(config-router)#network 192.168.1.248 0.0.0.3
Router(config-router)#
```

✓ Router 2

```
Router(config)#router eigrp 20
Router(config-router)#network 192.168.1.248 0.0.0.3
Router(config-router)#network 192.168.1.252 0.0.0.3
Router(config-router)#
```

✓ Router 3

```
Router(config)#router eigrp 20
Router(config-router)#network 192.168.1.8 0.0.0.3
Router(config-router)#network 192.168.1.4 0.0.0.3
Router(config-router)#
```

✓ Router 4

```
Router(config)#router eigrp 20
Router(config-router)#network 192.168.1.4 0.0.0.3
Router(config-router)#network 192.168.1.0 0.0.0.3
Router(config-router)#
```

✓ Router 5

```
Router(config)#router eigrp 20
Router(config-router)#network 20.0.0.0 0.255.255.255
Router(config-router)#network 192.168.1.252 0.0.0.3
Router(config-router)#network 192.168.1.8 0.0.0.3
Router(config-router)#
```

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions