Register Number															

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

Set - C

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	_____ in the data link layer separates a message from one source to a destination, or from other messages going from other sources to other destinations. A. Digitizing B. Controlling C. Framing D. Blocking	1	1	4	1	1.7.1
2	The receiver'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. How many spaces does the receiver window expand? A. 5 B. 9 C. 10 D. 15	1	3	4	2	2.6.3
4	Flow control is mainly a function of the _____ layer. A. application B. presentation C. session D. data link	1	1	4	1	1.7.1
5	For Stop-and-Wait ARQ, for 10 data packets sent, _____ acknowledgments are needed A. exactly 10 B. less than 10 C. more than 10 D. exactly 10 **If Option A or D or Both is/are marked, award the mark**	1	3	4	2	2.6.3
6	In the _____ protocol we avoid unnecessary transmission by sending only frames that are corrupted A. Stop-and-Wait ARQ B. Go-Back-N ARQ C. Selective-Repeat ARQ D. Both A & C	1	1	4	1	1.7.1

7	Adding *r* redundant bits to each block to make the length $n = k + r$. The resulting n-bit blocks are called _____ A. datawords B. blockwords C. codewords D. stringwords	1	3	4	2	2.6.3
8	The Hamming distance between 100 and 001 is _____ A. 2 B. 0 C. 1 D. 4	1	2	4	2	2.6.3
9	To avoid collisions on wireless networks, _____ was invented. A. CSMA/CA B. CSMA/CD C. CSMA/AD D. both (A) and (B)	1	1	4	1	1.7.1
10	The _____ is the basis for all bit-oriented protocols in use today A. SDLC B. HDLC C. PPP D. LAP	1	1	4	1	1.7.1
11#	EIGRP is an acronym for_____ Enhanced Interior Gateway Routing Protocol	1	1	6	1	1.7.1
12	In _____ forwarding, the destination address is a network address in the routing table A. next-hop B. network-specific C. host-specific D. default	1	1	6	1	1.7.1
13	The routing processor of a router performs the _____ layer functions of the router A. physical and data link B. network C. transport D. session	1	1	6	1	1.7.1
14	In distance vector routing, each node periodically shares its routing table with _____ and whenever there is a change. A. every other node B. its immediate neighbors C. one neighbor D. two neighbors	1	1	6	1	1.7.1
15	A one-to-many communication between one source and a specific group of hosts is classified as a _____ communication. A. unicast B. multicast C. broadcast D. local cast	1	1	6	2	2.6.3
16	Which protocol gives a full route table update every 30 seconds? A. IEGRP B. RIP C. ICMP D. IP	1	1	6	1	1.7.1
17	In EIGRP best path is known as the successor, where as backup path is known as _____ A. Feasible successor B. Back-up route C. Default route D. There is no backup route in EIGRP	1	1	6	1	1.7.1
18	Which BGP message is sent when an error condition is detected? A. BGP update message B. BGP keepalive message C. BGP open message D. BGP notification message	1	1	6	1	1.7.1
19	In which routing method do all the routers have a common database? A. Distance Vector B. Link Vector C. Shortest path D. Link State	1	1	6	1	1.7.1
20	The outcome of Dijkstra's calculation is used to populate the ____ A. Topology table B. Routing table C. Neighbor table D. Adjacency table	1	1	6	1	1.7.1

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Part – B (2 x 5 = 10 Marks)

Instructions: Answer ALL questions

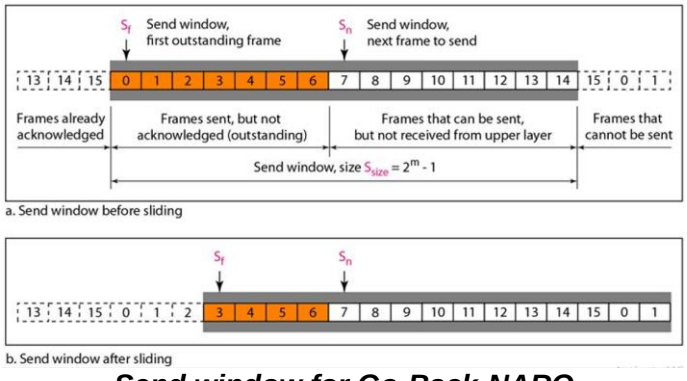
Q. No	Question	Marks	BL	CO	PO	PI Code
21	Compare and contrast the Stop-and-Wait ARQ Protocol with the Go-Back-N ARQ Protocol. **Answer:** ✓ Go-Back-N ARQ is more efficient than Stop-and-Wait ARQ. ✓ The Go-Back-N ARQ uses pipelining, the Stop-and-Wait ARQ does not. ✓ In the Stop-and-Wait ARQ, we need to wait for an acknowledgment for each frame before sending the next one. ✓ In the Go-Back-N ARQ we can send several frames before receiving an acknowledgment.	5	2	4	1	1.7.1
22	Compare and contrast two different routing tables. **Answer:** ✓ A routing table can be either static or dynamic. ✓ A static routing table contains information entered manually. ✓ A dynamic routing table is updated periodically by using one of the dynamic routing protocols such as RIP, OSPF, or BGP.	5	2	4	1	1.7.1

Part – C (2 x 10 = 20 Marks)

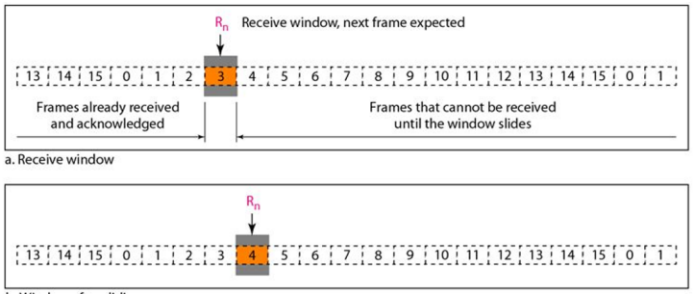
Instructions: Answer ALL questions

Q. No	Question	Marks	BL	CO	PO	PI Code
23. A	Explain Go-Back-N Automatic Repeat Request protocol with example. **Answer:** ✓ To improve the efficiency of transmission (filling the pipe), multiple frames must be in transition while waiting for acknowledgment. ✓ In other words, we need to let more than one frame be outstanding to keep the channel busy while the sender is waiting for acknowledgment.	10	2	4	1	1.7.1

- ✓ In this protocol we can send several frames before receiving acknowledgments; we keep a copy of these frames until the acknowledgments arrive.
- ✓ **Sequence Numbers:** Frames from a sending station are numbered sequentially.
- ✓ However, because we need to include the sequence number of each frame in the header, we need to set a limit. If the header of the frame allows *m* bits for the sequence number, the sequence numbers range from *0* to 2^m *- 1*. For example, if *m* is 4, the only sequence numbers are 0 through 15 inclusive.
- ✓ However, we can repeat the sequence. So, the sequence numbers are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 . . . .
- ✓ **Sliding Window:** In this protocol (and the next), the sliding window is an abstract concept that defines the range of sequence numbers that is the concern of the sender and receiver.
- ✓ In other words, the sender and receiver need to deal with only part of the possible sequence numbers.
- ✓ The range which is the concern of the sender is called the send sliding window; the range that is the concern of the receiver is called the receive sliding window.
- ✓ The send window is an imaginary box covering the sequence numbers of the data frames which can be in transit.
- ✓ In each window position, some of these sequence numbers define the frames that have been sent; others define those that can be sent.
- ✓ The maximum size of the window is $2^m - 1$

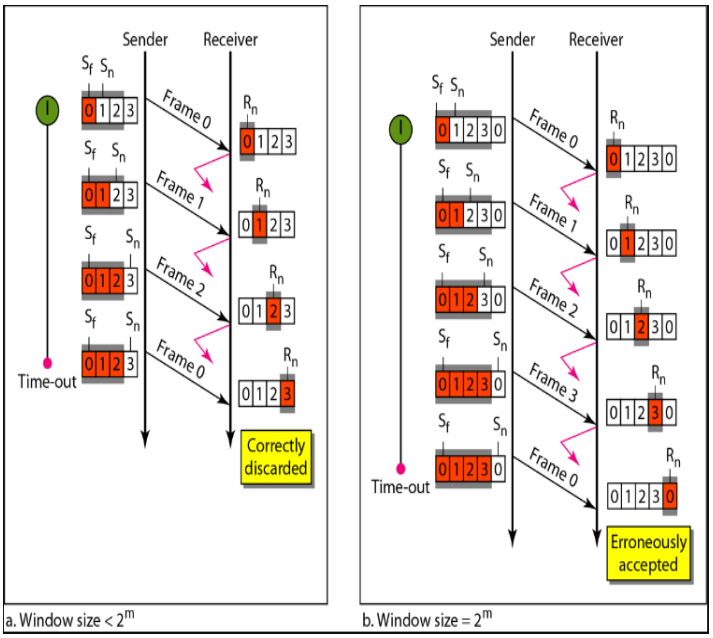


Send window for Go-Back-NARQ

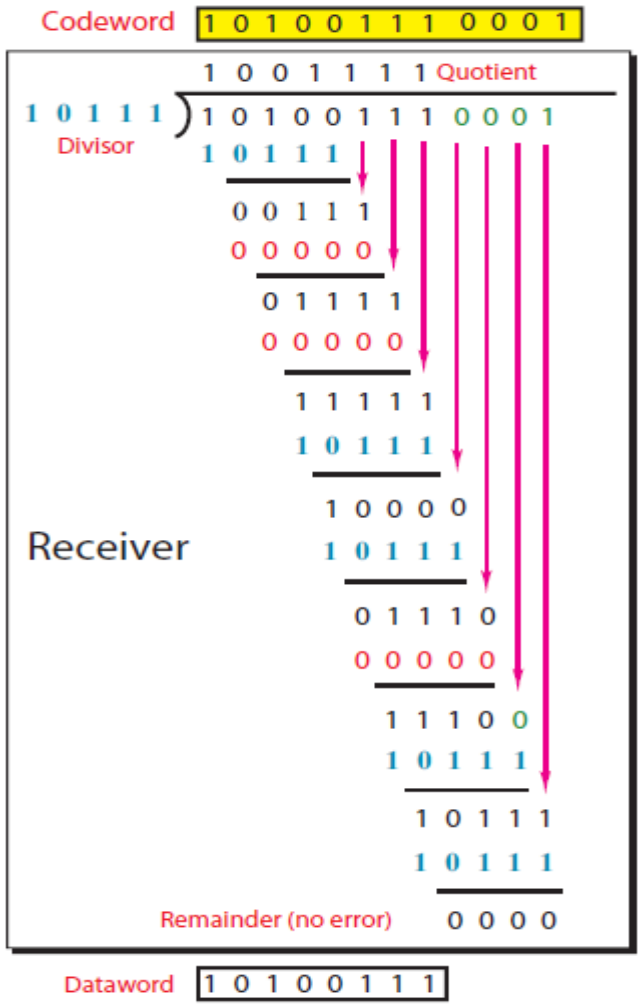


Receive window for Go-Back-NARQ

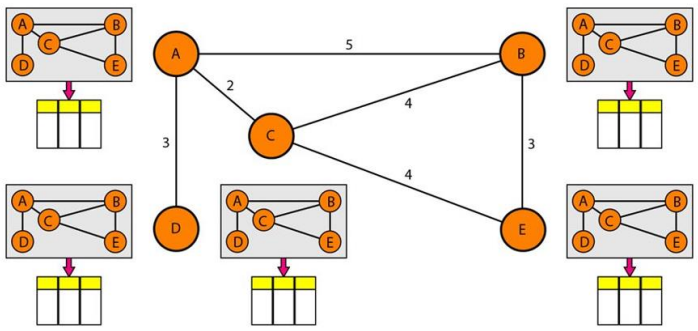
- ✓ Below example compares a window size of 3 against a window size of 4.

	✓ If the size of the window is 3 (less than 2^2) and all three acknowledgments are lost, the frame timer expires and all three frames are resent. ✓ The receiver is now expecting frame 3, not frame 0, so the duplicate frame is correctly discarded. On the other hand, if the size of the window is 4 (equal to 2^2) and all acknowledgments are lost, the sender will send a duplicate of frame 0. However, this time the window of the receiver expects to receive frame 0, so it accepts frame 0, not as a duplicate, but as the first frame in the next cycle. This is an error.  ✓ In Go-Back-N ARQ, the size of the send window must be less than 2^m and the size of the receiver window is always 1.					
	Or					
23. B.i.	Assuming even parity, find the parity bit for the data unit 0 0 0 1 1 0 0 **Answer:** Dataword: 0001100 | Number of 1s: 2 (even) | Parity: 0 | Codeword: 00001100	2	3	4	2	2.6.3
23. B.ii.	Given the codeword 1 0 1 0 0 1 1 1 0 0 0 1 and the divisor 1 0 1 1 1, Show the generation of the dataword at the receiver site (using binary division and assume no error).	8	3	4	2	2.6.3

Answer:

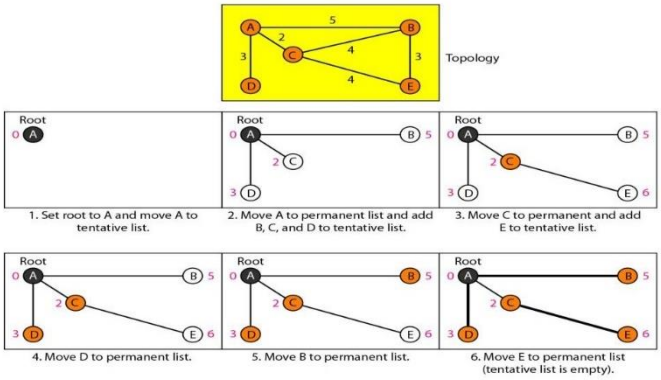


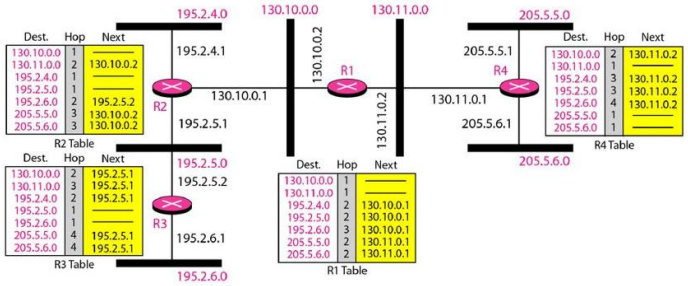
24. A	With suitable example, explain the Link State Routing Protocol. **Answer:** ✓ In link state routing, if each node in the domain has the entire topology of the domain the list of nodes and links, how they are connected including the type, cost (metric), and condition of the links (up or down)-the node can use Dijkstra's algorithm to build a routing table ✓ The below figure shows the concept of link state routing	10	1	6	1	1.7.1



Concept of link state routing

✓ The figure shows a simple domain with five nodes. Each node uses the same topology to create a routing table, but the routing table for each node is

	unique because the calculations are based on different interpretations of the topology. ✓ This is analogous to a city map. While each person may have the same map, each needs to take a different route to reach her specific destination ✓ ***Building Routing Tables:*** In link state routing, four sets of actions are required to ensure that each node has the routing table showing the least-cost node to every other node. 1. Creation of the states of the links by each node, called the link state packet (LSP). 2. Dissemination of LSPs to every other router, called flooding, in an efficient and reliable way. 3. Formation of a shortest path tree for each node. 4. Calculation of a routing table based on the shortest path tree. ✓ Example: formation of shortest path tree 					
Or						
24. B	Explain in detail about the Routing Information Protocol with proper example. **Answer:** ✓ The Routing Information Protocol (RIP) is an intradomain routing protocol used inside an autonomous system. ✓ It is a very simple protocol based on distance vector routing. ✓ RIP implements distance vector routing directly with some considerations: 1. In an autonomous system, we are dealing with routers and networks (links). The routers have routing tables; networks do not. 2. The destination in a routing table is a network, which means the first column defines a network address. 3. The metric used by RIP is very simple; the distance is defined as the number of links (networks) to reach the destination. For this reason, the metric in RIP is called a hop count. 4. Infinity is defined as 16, which means that any route in an autonomous system using RIP cannot have more than 15 hops. 5. The next-node column defines the address of the router to which the packet is to be sent to reach its destination. ✓ The below figure shows an autonomous system with seven networks and four routers. The ✓ table of each router is also shown	10	2	6	1	1.7.1

	 ✓ Let us look at the routing table for R1. The table has seven entries to show how to reach each network in the autonomous system. ✓ Router R1 is directly connected to networks 130.10.0.0 and 130.11.0.0, which means that there are no next-hop entries for these two networks. ✓ To send a packet to one of the three networks at the far left, router R1 needs to deliver the packet to R2. ✓ The next-node entry for these three networks is the interface of router R2 with IP address 130.10.0.1. ✓ To send a packet to the two networks at the far right, router R1 needs to send the packet to the interface of router R4 with IP address 130.11.0.1. ✓ The other tables can be explained similarly.					

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