

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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

College of Engineering and Technology
School of Computing

Academic Year: 2021-22 (Even)

Set - A

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	_____ control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for acknowledgment. A. Flow B. Error C. Transmission D. Data Control	1	1	4	1	1.7.1
2	In the sliding window method of flow control, the receiver window _____ size when frames are received A. increases in B. decreases in C. doubles in D. remains its original	1	2	4	2	2.6.3
3	A sender has a sliding window of size 15. The first 15 frames are sent. How many frames are in the window now? A. 0 B. 1 C. 14 D. 15	1	3	4	2	2.6.3
4	Which data link layer function answers the question: How much data may be sent? A. line discipline B. flow control C. error control D. session management	1	2	4	1	1.7.1
5#	HDLC is an acronym for _____ High-level data link control	1	1	4	1	1.7.1
6	The _____ Protocol has both flow control and error control A. Stop-and-Wait B. Go-Back-N ARQ C. Selective-Repeat ARQ D. both (b) and (c)	1	2	4	1	1.7.1

7	The _____ between two words is the number of differences between corresponding bits A. Hamming code C. Hamming rule B. Hamming distance D. Hamming length	1	2	4	2	2.6.3
8	In block coding, if $k=2$ and $n=3$, we have _____ invalid codewords A. 8 B. 4 C. 2 D. 0	1	3	4	2	2.6.3
9	_____ is a multiple-access method in which the available bandwidth of a link is shared in time, frequency, or through code, between different stations. A. Controlled access C. Serial access B. Channelization D. Random access	1	2	4	1	1.7.1
10	HDLC and PPP are _____ layer protocols A. Data link B. Network C. Physical D. Presentation	1	1	4	1	1.7.1
11	In _____ forwarding, the full IP address of a destination is given in the routing table. A. next-hop C. host-specific B. network-specific D. default	1	2	6	1	1.7.1
12	A _____ routing table is updated periodically using one of the dynamic routing protocols A. static B. dynamic C. hierarchical D. hybrid	1	1	6	1	1.7.1
13	The task of moving the packet from the input queue to the output queue in a router is done by _____. A. input and output ports C. switching fabrics B. routing processor D. routing ports	1	1	6	1	1.7.1
14	The _____ routing uses the Dijkstra algorithm to build a routing table. A. distance vector C. path vector B. link state D. vector	1	1	6	1	1.7.1
15	The OSPF protocol is an intradomain routing protocol based on _____ routing. A) distance vector C) path vector B) link state D) link vector	1	1	6	1	2.6.3
16	How often does a RIPv1 router broadcast its routing table by default? a) Every 30 seconds c) Every 90 seconds b) Every 60 seconds d) RIPv1 does not broadcast periodically	1	1	6	1	1.7.1
17	Which command will display all the EIGRP feasible successor routes known to a router? A. show ip routes C. show ip eigrp topology B. show ip eigrp summary D. show ip eigrp adjacencies	1	1	6	1	1.7.1
18	How many entry and exit points can be found in a stub network? A. Five B. Four C. Two D. One	1	2	6	1	1.7.1
19	Distance vector routing algorithm is implemented in Internet as _____ A. OSPF B. RIP C. ARP D. APR	1	2	6	1	1.7.1
20	In OSPF, which protocol is used to discover neighbour routers automatically? A. Link state protocol C. Routing information protocol B. Error-correction protocol D. Hello protocol	1	1	6	1	1.7.1

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Part – B (2 x 5 = 10 Marks)

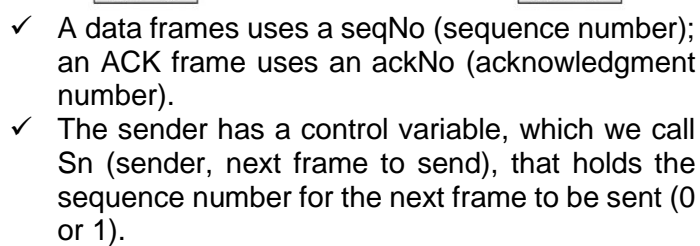
Instructions: Answer ALL questions

Q. No	Question	Marks	BL	CO	PO	PI Code
21	<p>Compare and contrast byte-oriented and bit-oriented protocols. Which category is popular now (explain the reason)?</p> <p>Answer:</p> <ul style="list-style-type: none"> ✓ In a byte-oriented protocol, data to be carried are 8-bit characters from a coding system. ✓ Character-oriented protocols were popular when only text was exchanged by the data link layers. ✓ In a bit-oriented protocol, the data section of a frame is a sequence of bits. ✓ Bit-oriented protocols are more popular today because we need to send text, graphic, audio, and video which can be better represented by a bit pattern than a sequence of characters. 	5	2	4	1	1.7.1
22	<p>What are the functions of a RIP message? Why do OSPF messages propagate faster than RIP messages?</p> <p>Answer:</p> <ul style="list-style-type: none"> ✓ A RIP message is used by a router to request and receive routing information about an autonomous system or to periodically share its knowledge with its neighbors. ✓ OSPF messages are propagated immediately because a router using OSPF will immediately flood the network with news of any changes to its neighborhood. ✓ RIP messages are distributed slowly because a network using RIP relies on the periodic updates that occur every 30 seconds to carry any news from one router to the next and to the next. 	5	2	6	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	<p>Explain in detail with an example the Stop-and-Wait Automatic Repeat Request Protocol's mechanism.</p> <p>Answer:</p> <ul style="list-style-type: none"> ✓ To detect and correct corrupted frames, we need to add redundancy bits to our data frame. ✓ When the frame arrives at the receiver site, it is checked and if it is corrupted, it is silently discarded. ✓ The detection of errors in this protocol is manifested by the silence of the receiver. ✓ When the receiver receives a data frame that is out of order, this means that frames were either ✓ lost or duplicated. ✓ The completed and lost frames need to be resent in this protocol. If the receiver does not respond when there is an error, how can the sender know which frame to resend? the sender keeps a copy of the sent frame. At the same time, it starts a timer. ✓ If the timer expires and there is no ACK for the sent frame, the frame is resent, the copy is held, and the timer is restarted. ✓ Since the protocol uses the stop-and-wait mechanism, there is only one specific frame that needs an ACK even though several copies of the same frame can be in the network ✓ Sequence Numbers: A field is added to the data frame to hold the sequence number of that frame is known as sequence number. ✓ In Stop-and-Wait ARQ we use sequence numbers to number the frames. The sequence numbers are based on modulo-2 arithmetic. ✓ Acknowledgment Numbers: Since the sequence numbers must be suitable for both data frames and ACK frames, we use this convention: The acknowledgment numbers always announce the sequence number of the next frame expected by the receiver ✓ In Stop-and-Wait ARQ the acknowledgment number always announces in modulo-2 arithmetic the sequence number of the next frame expected. ✓ Design: The sending device keeps a copy of the last frame transmitted until it receives an acknowledgment for that frame. 	10	1	4	1	1.7.1



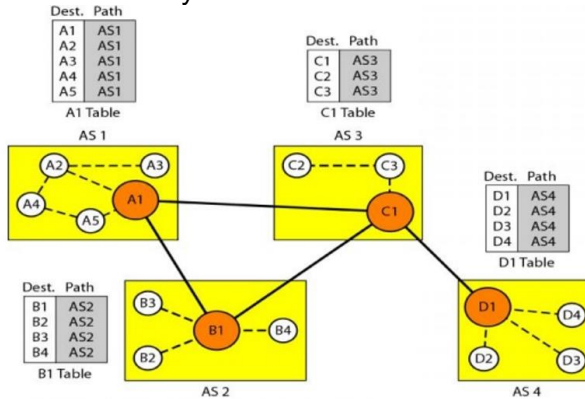
Assuming even parity, find the parity bit for the data unit 1 0 0 1 0 1 1

Dataword	Number of 1s	Parity	Codeword
1001011	4 (even)	0	01001011

2.6.3

23. B. ii.	<p>Given the dataword 1 0 1 0 0 1 1 1 0 and the divisor 1 0 1 1 1, Show the generation of the codeword at the sender site (using binary division).</p> <p>Answer:</p> <p>The diagram shows the following steps:</p> <ul style="list-style-type: none"> Dataword: 1 0 1 0 0 1 1 1 Divisor: 1 0 1 1 1 Quotient: 1 0 0 1 1 1 1 Remainder: 0 0 0 1 Codeword: 1 0 1 0 0 1 1 1 0 0 0 1 <p>The diagram is labeled "Sender" and shows the long division process with arrows indicating the shifting of the divisor and the subtraction of the product from the dataword.</p>	8	3	4	2	2.6.3
24. A	<p>Explain the path vector protocol with example.</p> <p>Answer:</p> <ul style="list-style-type: none"> ✓ Path vector routing proved to be useful for interdomain routing. ✓ The principle of path vector routing is similar to that of distance vector routing. ✓ In path vector routing, we assume that there is one node (there can be more, but one is enough for our conceptual discussion) in each autonomous system that acts on behalf of the entire autonomous system. ✓ Let us call it the speaker node. The speaker node in an AS creates a routing table and advertises it to speaker nodes in the neighboring ASs. ✓ The idea is the same as for distance vector routing except that only speaker nodes in each AS can communicate with each other. ✓ However, what is advertised is different. A speaker node advertises the path, not the metric 	10	1	6	1	1.7.1

of the nodes, in its autonomous system or other autonomous systems.



Initial routing tables in path vector routing

- ✓ Node A1 is the speaker node for AS1, B1 for AS2, C1 for AS3, and D1 for AS4.
- ✓ Node A1 creates an initial table that shows A1 to A5 are located in AS1 and can be reached through it.
- ✓ Node B1 advertises that B1 to B4 are located in AS2 and can be reached through B1. And so on.

Dest.	Path	Dest.	Path	Dest.	Path	Dest.	Path
A1	AS1	A1	AS2-AS1	A1	AS3-AS1	A1	AS4-AS3-AS1
A5	AS1	A5	AS2-AS1	A5	AS3-AS1	A5	AS4-AS3-AS1
B1	AS1-AS2	B1	AS2	B1	AS3-AS2	B1	AS4-AS3-AS2
B4	AS1-AS2	B4	AS2	B4	AS3-AS2	B4	AS4-AS3-AS2
C1	AS1-AS3	C1	AS2-AS3	C1	AS3	C1	AS4-AS3
C3	AS1-AS3	C3	AS2-AS3	C3	AS3	C3	AS4-AS3
D1	AS1-AS2-AS4	D1	AS2-AS3-AS4	D1	AS3-AS4	D1	AS4
D4	AS1-AS2-AS4	D4	AS2-AS3-AS4	D4	AS3-AS4	D4	AS4

Stabilized tables for three autonomous systems

Or

24. B

Demonstrate the Open Shortest Path First protocol with example.

Answer:

- ✓ The Open Shortest Path First or OSPF protocol is an intradomain routing protocol based on link state routing. Its domain is also an autonomous system.
- ✓ Areas To handle routing efficiently and in a timely manner, OSPF divides an autonomous system into areas. An area is a collection of networks, hosts, and routers all contained within an autonomous system.
- ✓ An autonomous system can be divided into many different areas. All networks inside an area must be connected
- ✓ Routers inside an area flood the area with routing information. At the border of an area, special routers called area border routers summarize the information about the area and send it to other areas.
- ✓ Among the areas inside an autonomous system is a special area called the backbone; all the areas inside an autonomous system must be connected to the backbone.
- ✓ In other words, the backbone serves as a primary area and the other areas as secondary areas. This does not mean that the routers within areas cannot be connected to each other, however. The

10

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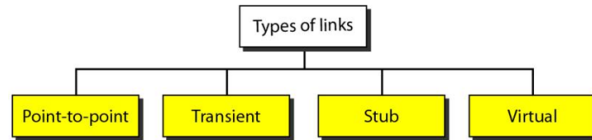
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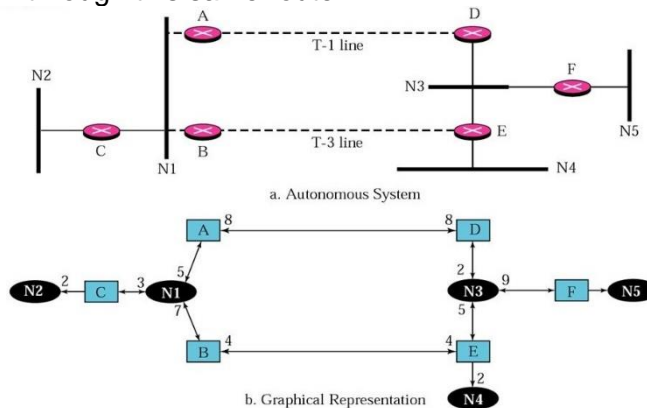
1.7.1

routers inside the backbone are called the backbone routers. Note that a backbone router can also be an area border router.

- ✓ The OSPF protocol allows the administrator to assign a cost, called the metric, to each route.
- ✓ The metric can be based on a type of service (minimum delay, maximum throughput, and so on). As a matter of fact, a router can have multiple routing tables, each based on a different type of service
- ✓ Types of Links in OSPF terminology, a connection is called a link. Four types of links have been defined: point-to-point, transient, stub, and virtual



- ✓ A **point-to-point link** connects two routers without any other host or router in between
- ✓ A **transient link** is a network with several routers attached to it. The data can enter through any of the routers and leave through any router
- ✓ A **stub link** is a network that is connected to only one router. The data packets enter the network through this single router and leave the network through this same router.



Example of an AS and its graphical representation in OSPF

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

