SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing

Mode of Exam
OFFLINE

DEPARTMENT OF COMPUTING TECHNOLOGIES

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (ODD)

SET 1

Test: CLAT-2 **Date: 17-10-2022**
Course Code & Title: 18CSE453T & Network Routing Algorithms **Duration:** 2 Hour
Year & Sem: III &V **Max. Marks:** 50

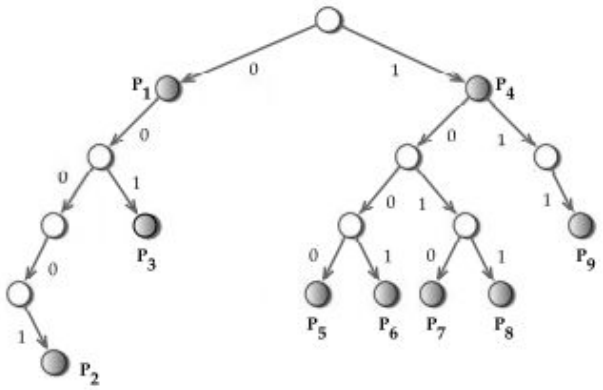
Course Articulation Matrix: ***(to be placed)***

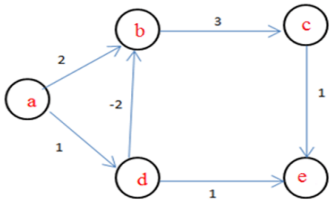
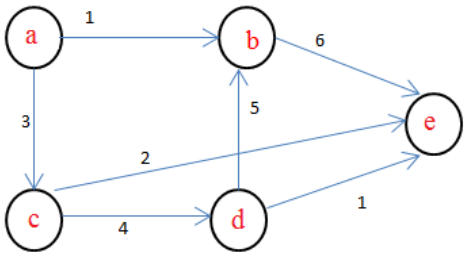
S.NO	CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	2	-	-	1	-	-	-	-	2	-	3		-	-
2	C02	3	3	2	2	1	-	-	-	-	-	1	3	-	-	-
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

Part - A
(20x 1 = 20 Marks)

Instructions: Answer All 20

Q. No	Question	Marks	BL	CO	PO	PI Code
1	From the below list ,select the router forwarding functions i.IP Header Validation ii.Packet Lifetime Control iii.Checksum Recalculation iv.Route Lookup A. i B. i,ii C. i,ii,iii D. I,ii,iii,iv Answer: D	1	1	2	1	1.6.1
2	Which one of the following network devices is used to connect different networks? A. Hub B. Switch C. Router D. Repeater Answer :C	1	1	2	1	1.6.1
3	Which in not a classification of router architectures? A. Shared CPU architectures B. Shared forwarding engine architectures C. Shared nothing architectures D. Shared Back warding architectures. Answer : D	1	1	2	1	1.6.1
4	The Routing processor searches in the routing table is known as A. Switch Fabric B. Address Lookup C. Buffer D. Rolling Table Answer : B	1	1	2	1	1.6.1

5	Find Naïve algorithms time complexity for search. A. O(N). B. $O^2(N)$ C. O log(N) D. $O_2(N)$ Answer :A	1	1	2	2	2.6.1
6	**In a Binary Tries algorithm left branch of a node is labeled as _____** A. 0 B. 1 C. 2 D. 3 Answer : A	1	1	2	2	2.6.1
7	**Find the P2 address using Binary Tries**  A. 00 B. O1 C. 0001 D. 00001 Answer :D	1	2	2	2	2.6.3
8	A program to search a contact from phone directory can be implemented efficiently using _____ A. BST B. trie C. balanced BST D. binary tree Answer : B	1	1	2	1	1.6.1
9	Select from the following which command is used to operate TCP/IP routing table A. Show IP route B. Route C. Ipconfig D. Traceroute Answer : B	1	1	2	1	1.6.1
10	To achieve high speeds, the fast path functions are implemented in custom hardware, such as _____ A. ASIC B. ARP C. RARP D. SAIC Answer : A	1	1	2	1	1.6.1
11	What is the running time of Bellmann Ford Algorithm? A. O(V) B. $O(V^2)$ C. O(ElogV) D. O(VE) Answer : D	1	2	3	2	2.6.3

12	Consider the following graph. What is the minimum cost to travel from node A to node C?  A. 5 B. 6 C. 2 D. 3 Answer : C	1	2	3	3	3.6.3
13	A graph is said to have a negative weight cycle when? A. The graph has 1 negative weighted edge B. The graph has a cycle C. The total weight of the graph is negative D. The graph has 1 or more negative weighted edges Answer : C	1	1	3	1	1.6.1
14	Dijkstra's Algorithm is used to solve _____ problems. A. All pair shortest path B. Single source shortest path C. Network flow D. Sorting Answer : B	1	1	3	1	1.6.1
15	In the given graph, identify the shortest path having minimum cost to reach vertex E if A is the source vertex.  A. a-b-e B. a-c-e C. a-c-d-e D. a-c-d-b-e Answer :B	1	2	3	3	3.6.3
16	The storage media for the distance vector routing algorithm is _____ the one for the link state routing A. More than B. less than C. equal to Answer : B	1	1	3	1	1.6.1
17	Which of the following statements is true about path vector routing? A. Path vector routing is similar to the link state router. B. Exterior Gateway Protocol (EGP) is used in Path Vector. C. Maintains the path information and gets updated dynamically. D. Not flexible in selecting the path while hiding the information. Answer : C	1	2	3	2	2.6.1

18	In distance vector routing, If a router is connected to three networks , its original table contains ____entries A. 1 B. 2 C. 3 D. 4 Answer : C	1	1	3	1	1.6.1
19	Which is the example of path vector protocol? A. BGP B. IGMP C. ICMP D. HTTP Answer :A	1	1	3	1	1.6.1
20	Dijkstra's Algorithm cannot be applied on _____ A. Directed and weighted graphs B. Graphs having negative weight function C. Unweighted graphs D. Undirected and unweighted graphs Answer :B	1	1	3	1	1.6.1

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3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

Part – B
(2x5 = 10 Marks)

21 Compare Routing Table versus Forwarding Table

Routing Table versus Forwarding Table

Routing Table	Forwarding Table
The routing table is constructed by the routing algorithms based on the information exchanged between neighboring routers by the routing protocols.	The forwarding table, on the other hand, is consulted by the router to determine the output interface an incoming packet needs to be forwarded.
Each entry in the routing table maps an IP prefix to a next hop.	Each entry in the forwarding table maps an IP prefix to an outgoing interface
The routing tables are usually implemented in software	Forwarding table is implemented in a specialized hardware for high-speed routers.
The routing table indicates the next-hop IP address for a destination IP prefix.	The forwarding table tells us a packet bound to the network identified by the IP prefix should be forwarded to interface eth0 with the appropriate MAC address.

Routing table

IP prefix	Next hop
10.5.0.0/16	192.168.5.254

Forwarding table

IP prefix	Interface	MAC address
10.5.0.0/16	eth0	00:0F:1F:CC:F3:06

(OR)

22 Analyze about packet flow in router with neat diagram
Analyze: 2 Marks
Diagram : 3 Marks

23 Discuss about link state routing algorithm with example
Explanation : 3Marks
Example : 2Marks

(OR)

24 Explain about Distance Vector Routing Protocol with example
Discuss about link state routing algorithm with example
Explanation : 3Marks
Example : 2Marks

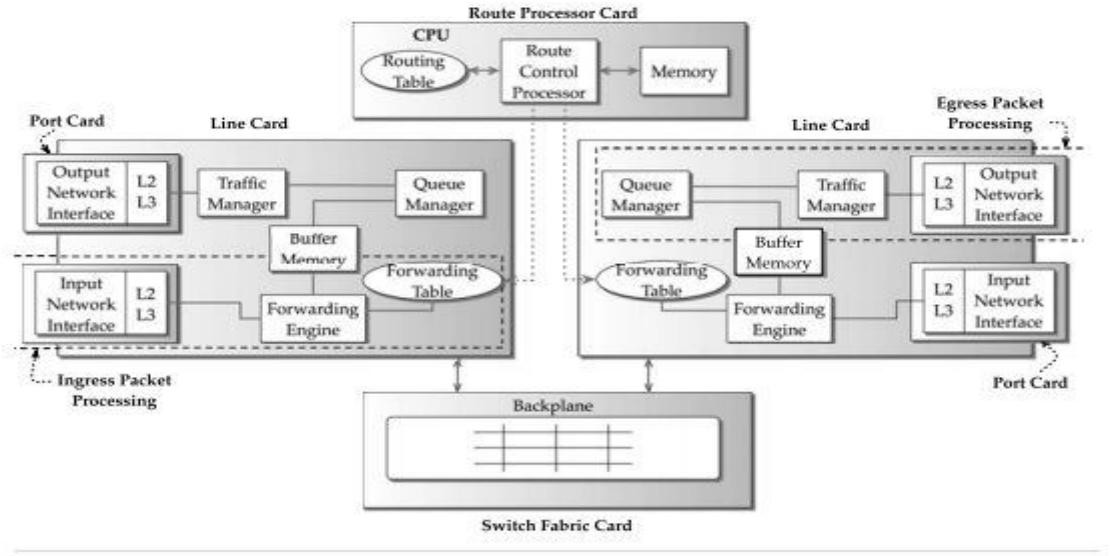
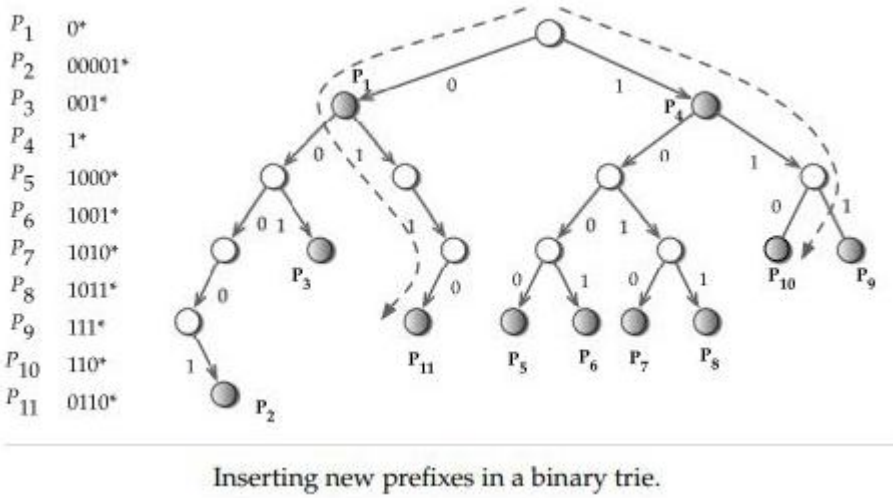
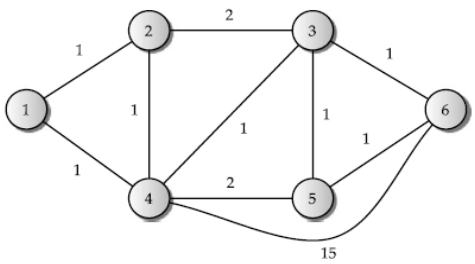
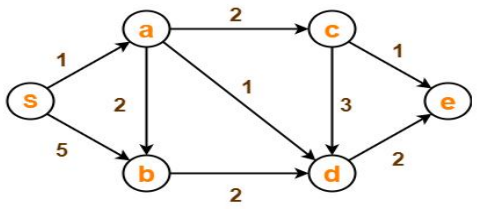
Part – C (2x10 = 20 Marks)	
25	Draw and Explain architectural Components of a Router Explanation : 5 Marks Diagram : 5 Marks 
	(OR)
26	How to insert new node in Binary ties? Explain with diagram Explanation : 5 marks Diagram : 5 Marks  Inserting new prefixes in a binary trie.
27	 Compute the shortest path from node 1 to all using Bellman–Ford algorithm.

TABLE Minimum cost from node 1 to other nodes

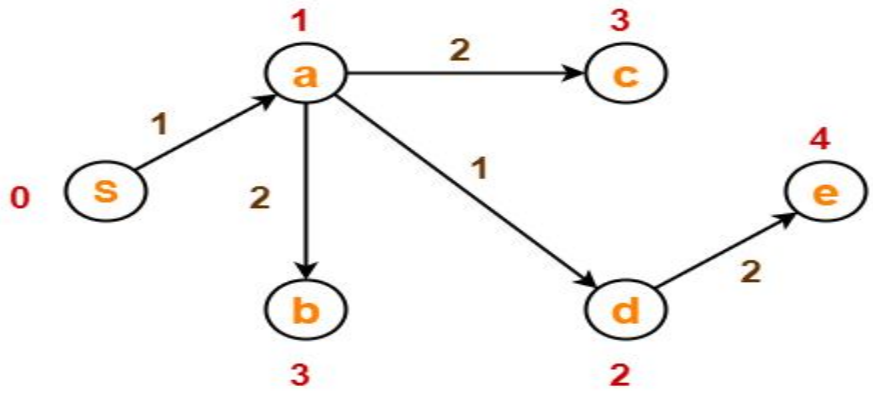
h	$\overline{D}_{12}^{(h)}$	Path	$\overline{D}_{13}^{(h)}$	Path	$\overline{D}_{14}^{(h)}$	Path	$\overline{D}_{15}^{(h)}$	Path	$\overline{D}_{16}^{(h)}$	Path
0	∞	–	∞	–	∞	–	∞	–	∞	–
1	1	1-2	∞	–	1	1-4	∞	–	∞	–
2	1	1-2	2	1-4-3	1	1-4	3	1-4-5	16	1-4-6
3	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6
4	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6
5	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6

(OR)

28 Using Dijkstra's Algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph

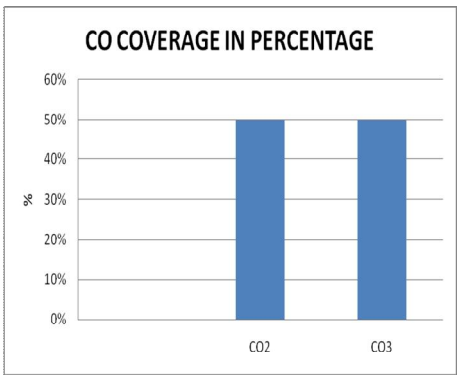


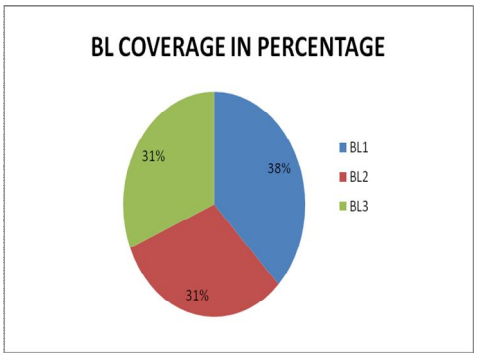
Answer :



***Performance Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

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





Approved by the Audit Professor/Course Coordinator

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SET 2

Answer key

Test: CLAT-2 **Date:**
Course Code & Title: 18CSE453T & Network Routing Algorithms **Duration:** 2 Hour
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1	CO1	3	2	-	-	1	-	-	-	-	2	-	3		-	-
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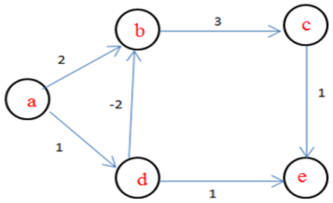
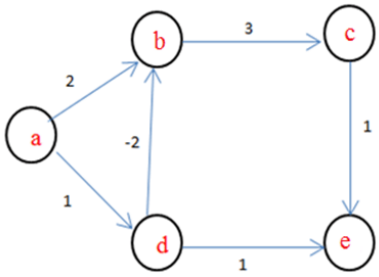
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

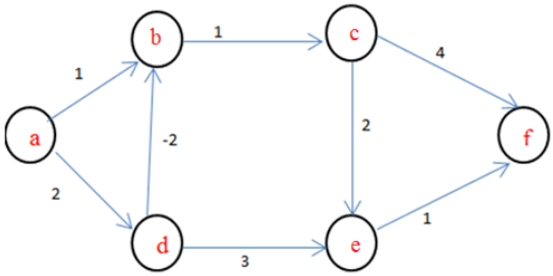
Part - A
(20x 1 = 20 Marks)

Instructions: Answer all 20

Q. No	Question	Marks	BL	CO	PO	PI Code
1	From the below options which one is not a router protocol A. OSPF B. BGP C. RIP D. PPP Answer : D	1	1	2	1	1.6.1
2	A _____ is a device that forwards data that is not explicitly destined to it. A. Hub B. Switch C. Router D. Bridge Answer : C	1	1	2	1	1.6.1
3	Routing protocols can be divided in _____ categories. A. 2 B. 3 C. 4 D. 5 Answer : A	1	1	2	1	1.6.1
4	In the below options which is not a elements of a Router. A. Forwarding Engines B. Queue Manager C. Traffic Manager D. Backward Engines Answer: D	1	1	2	1	1.6.1

5	In a Shared CPU Architecture The packet is subsequently prioritized by the_____ A. Forwarding Engines B. Traffic Manager C. queue manager D. Route Control Processor Answer : C	1	1	2	1	1.6.1
6	Analysis different type of routing architecture packets are transferred from one line card to another A. Shared CPU architecture B. Shared forwarding Engine Architecture C. Shared Nothing Architectures D. Clustered Architecture Answer :B	1	1	2	1	1.6.1
7	Routers forward a packet using forwarding table entries. The network address of the incoming packet may match multiple entries. How do routers resolve this? A. Forward it to the router whose entry matches with the longest prefix of the incoming packet B. Forward the packet to all routers whose network addresses match. C. Discard the packet. D. Forward it the router whose entry matches with the longest suffix of an incoming packet Answer :A	1	2	2	2	2.6.3
8	Classless Inter-domain Routing receives a packet with address 131.23.151.76. The router's routing table has the following entries Prefix Output Interface Identifier A. 131.16.0.0/12 3 B. 131.28.0.0/14 5 C. 131.19.0.0/16 2 D. 131.22.0.0/15 1 Answer : A	1	2	2	2	2.6.3
9	Consider the forwarding table at a router. A forwarding table. Entry Number | Prefix | Next-Hop 1 | 98.1.1.1/24 | eth3 2 | 171.1.0.0/16 | so6 3 | 171.1.1.0/24 | fe5 If the destination address of the incoming packet is 98.1.1.2 .what is the output interface? A. 98.1.1.1 B. 171.1.1.1 C. 171.1.1.0 D. 172.1.1.1 Answer : A	1	2	2	2	2.6.3
10	In a Binary Tries algorithm right branch of a node is labeled as _____ A. 0 B. 1 C. 10 D. 11 Answer : B	1	1	2	1	1.6.1
11	The Bellmann Ford algorithm returns _____ value. A. Boolean B. Integer C. String D. Double Answer :A	1	1	3	1	1.6.1

12	What is the basic principle behind Bellmann Ford Algorithm? A. Interpolation B. Extrapolation C. Regression D. Relaxation Answer:D	1	1	3	1	1.6.1
13	Which of the following is the most commonly used data structure for implementing Dijkstra's Algorithm? A. Max priority queue B. Stack C. Circular queue D. Min priority queue Answer :D	1	1	3	1	1.6.1
14	Consider the following graph. What is the minimum cost to travel from node A to node C?  A. 5 B. 6 C. 2 D. 3 Answer : C	1	2	3	2	2.6.3
15	Which is the example of path vector protocol? A. BGP B. IGMP C. ICMP D. HTTP Answer :A	1	1	3	1	1.6.1
16	The first step in the naïve greedy algorithm is? A. Analyzing the zero flow B. Calculating the maximum flow using trial and error C. Adding flows with higher values D. Reversing flow if required Answer: A	1	2	3	2	2.6.3
17	Consider the following graph. What is the minimum cost to travel from node b to node e?  A. 5 B. 2 C. 4 D. 3 Answer : C	1	2	3	2	2.6.3

18	In the given graph, identify the path that has minimum cost to travel from node a to node f.  A. a-b-c-f B. a-d-e-f C. a-d-b-c-f D. a-d-b-c-e-f Answer: D	1	2	3	2	2.6.3
19	How many times the for loop in the Bellmann Ford Algorithm gets executed? A. V times B. V-1 C. E D. E-1 Answer :B	1	1	3	1	1.6.1
20	In distance vector routing, If a router is connected to three networks , its original table contains ____entries A. 1 B. 2 C. 3 D. 4 Answer : C	1	1	3	1	1.6.1

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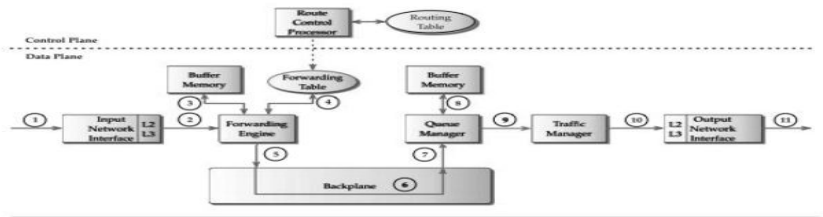
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

Part – B
(2x5 = 10 Marks)

21 How the packets are flow from one element to another element? Explain with neat diagram.
Diagram: 3 Marks
Explanation: 2 Marks

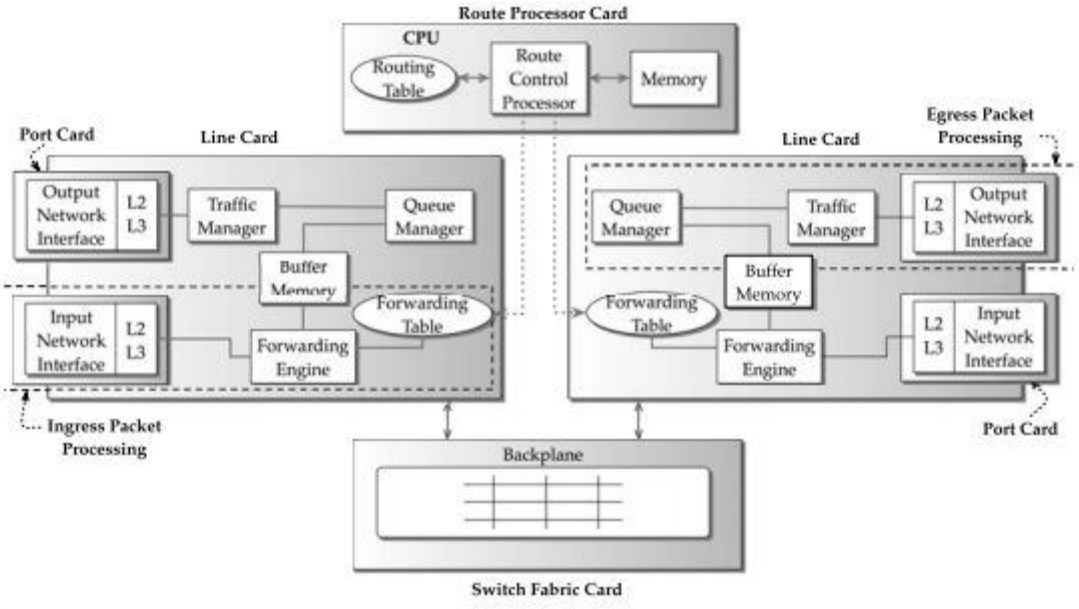


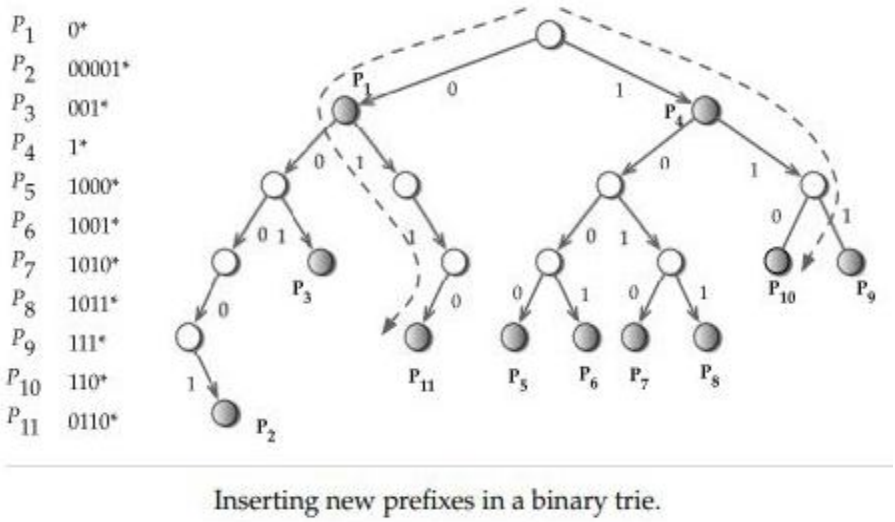
Packet flow in a router.

(OR)

22 Compare Routing Table versus Forwarding Table

Routing Table	Forwarding Table
The routing table is constructed by the routing algorithms based on the information exchanged between neighboring routers by the routing protocols.	The forwarding table, on the other hand, is consulted by the router to determine the output interface an incoming packet needs to be forwarded.
Each entry in the routing table maps an IP prefix to a next hop.	Each entry in the forwarding table maps an IP prefix to an outgoing interface
The routing tables are usually implemented in software	Forwarding table is implemented in a specialized hardware for high-speed routers.
The routing table indicates the next-hop IP address for a destination IP prefix.	The forwarding table tells us a packet bound to the network identified by the IP prefix should be forwarded to interface eth0 with the appropriate

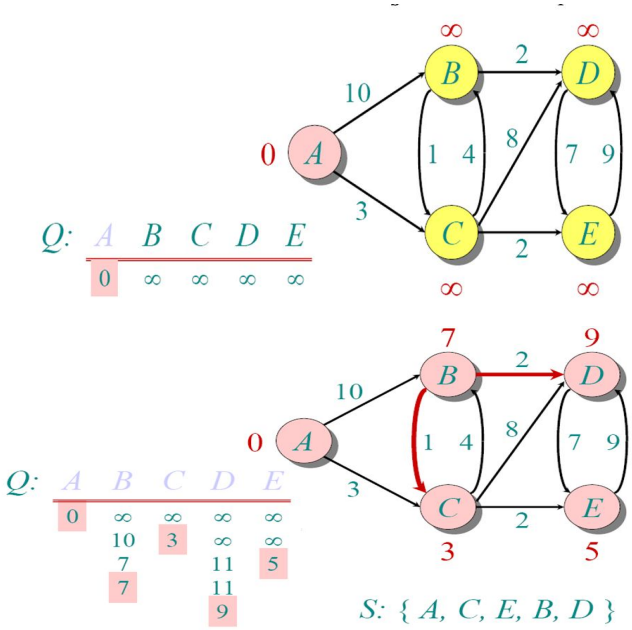
			MAC address.
		Routing table IP prefix | Next hop 10.5.0.0/16 | 192.168.5.254	Forwarding table IP prefix | Interface 10.5.0.0/16 | eth0
23	Elucidate Distance Vector Routing Protocol algorithm with example. Explanation : 3 Marks Example : 2 Marks		
	(OR)		
24	Explain link state Routing Protocol algorithm with example. Explanation : 3 Marks Example : 2 Marks		
	Part – C **(2x10 = 20 Marks)**		
25	Draw the router architectural components and explain each component in detail. Diagram -5 marks Explanation – 5 Marks • Network Interfaces • Forwarding Engines • Queue Manager • Traffic Manager • Backplane • Route Control Processor  		
	(OR)		
26	Delete the P4 node from the Binary tries that are given. After Deleted P4 node Draw the new tries and explain how to delete.		



Inserting new prefixes in a binary trie.

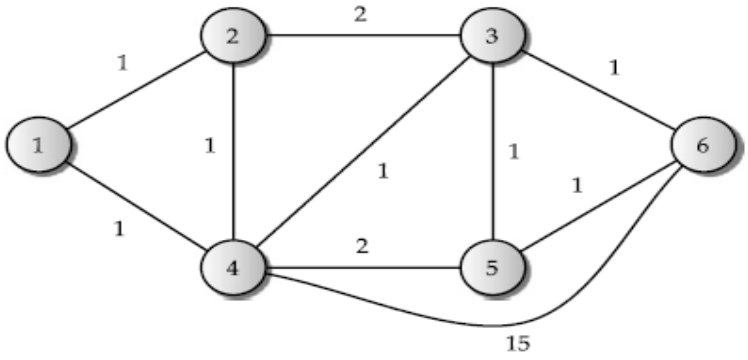
Explanation : 5 marks
Diagram : 5 Marks

27 Using Dijkstra's Algorithm, find the shortest distance from source vertex 'A' to remaining vertices in the following graph



(OR)

28



Compute the shortest path from node 2 to all using Bellman–Ford algorithm.
Steps : 5 Marks
Table : 5 marks

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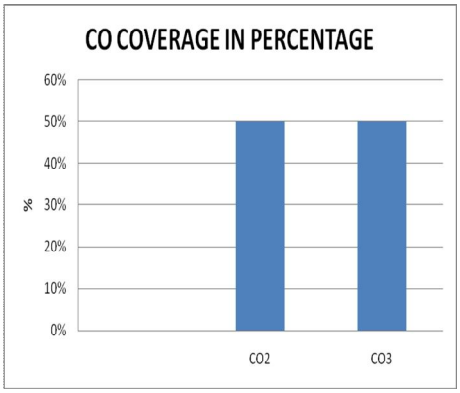
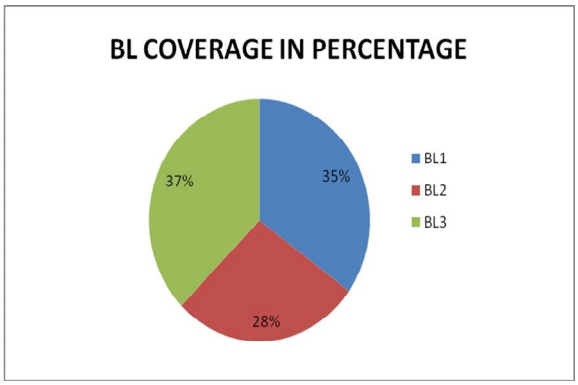
Course Outcome (CO) and Bloom's level (BL) Coverage in Questions





Approved by the Audit Professor/Course Coordinator

SRM Institute of Science and Technology
College of Engineering and Technology
School of Computing

Mode of Exam
OFFLINE

DEPARTMENT OF COMPUTING TECHNOLOGIES

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (ODD)

SET 3

Test: CLAT-2 **Date: 17-10-2022**
Course Code & Title: 18CSE453T & Network Routing Algorithms **Duration:** 2 Hour
Year & Sem: III &V **Max. Marks:** 50

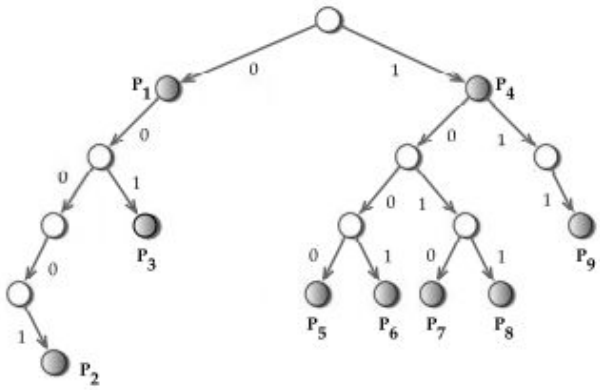
Course Articulation Matrix: ***(to be placed)***

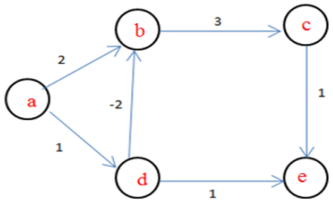
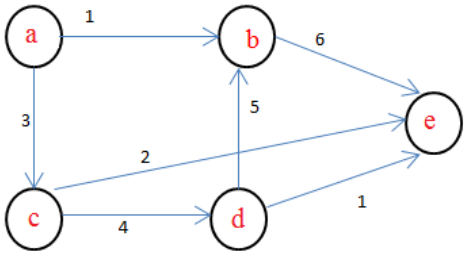
S.NO	CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	2	-	-	1	-	-	-	-	2	-	3		-	-
2	CO2	3	3	2	2	1	-	-	-	-	-	1	3	-	-	-
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

Part - A
(20x 1 = 20 Marks)

Instructions: Answer any 10

Q. No	Question	Marks	BL	CO	PO	PI Code
1	From the below list ,select the router forwarding functions i.IP Header Validation ii.Packet Lifetime Control iii.Checksum Recalculation iv.Route Lookup A. i B. i,ii C. i,ii,iii D. I,ii,iii,iv Answer: D	1	1	2	1	1.6.1
2	Which one of the following network devices is used to connect different networks? A. Hub B. Switch C. Router D. Repeater Answer :C	1	1	2	1	1.6.1
3	From the below list, select the classification of router architectures. i. Shared CPU architectures ii. Shared forwarding engine architectures iii. Shared nothing architectures iv. Shared Back warding architectures. A. i B. i,ii C. i,ii,iii D. I,ii,iii,iv Answer: C	1	1	2	1	1.6.1

4	The routing tables are usually implemented in_____ A. software B. hardware C. Software &Hardware Answer : A	1	1	2	1	1.6.1
5	Find Naïve algorithms time complexity for search. A. O(N). B. $O^2(N)$ C. O log(N) D. $O_2(N)$ Answer :A	1	1	2	2	2.6.1
6	**In a Binary Tries algorithm left branch of a node is labeled as _____** A. 0 B. 1 C. 2 D. 3 Answer : A	1	1	2	2	2.6.1
7	**Find the P4 address using Binary Tries**  A. 00 B. 01 C. 111 D. 00001 Answer :C	1	2	2	2	2.6.3
8	A program to search a contact from phone directory can be implemented efficiently using _____ A. BST B. trie C. balanced BST D. binary tree Answer : B	1	1	2	1	1.6.1
9	What are the types of Routers? 1.Core routers 2.Enterprise routers 3.An edge router 4.Gate Router A.1 B.1,2 C.1,2,3 D.1,2,3,4 Answer : C	1	1	2	1	1.6.1
10	Which routers are called access routers? A. Core routers B. Enterprise routers C. An edge router D. Gate Router Answer : B	1	1	2	1	1.6.1

11	What is the running time of Bellmann Ford Algorithm? A. O(V) B. $O(V^2)$ C. O(ElogV) D. O(VE) Answer : D	1	2	3	2	2.6.3
12	Consider the following graph. What is the minimum cost to travel from node 'b' to node 'e' ?  A. 4 B. 6 C. 2 D. 3 Answer : A	1	2	3	3	3.6.3
13	A graph is said to have a negative weight cycle when? A. The graph has 1 negative weighted edge B. The graph has a cycle C. The total weight of the graph is negative D. The graph has 1 or more negative weighted edges Answer : C	1	1	3	1	1.6.1
14	Dijkstra's Algorithm is used to solve _____ problems. A. All pair shortest path B. Single source shortest path C. Network flow D. Sorting Answer : B	1	1	3	1	1.6.1
15	In the given graph, identify the shortest path having minimum cost to reach vertex 'd' if 'a' is the source vertex.  A. a-b-e B. a-c-d C. a-c-d-e D. a-c-d-b-e Answer :B	1	2	3	3	3.6.3
16	The storage media for the distance vector routing algorithm is _____ the one for the link state routing A. More than B. less than C. equal to Answer : B	1	1	3	1	1.6.1

17	Which of the following statements is true about path vector routing? A. Path vector routing is similar to the link state router. B. Exterior Gateway Protocol (EGP) is used in Path Vector. C. Maintains the path information and gets updated dynamically. D. Not flexible in selecting the path while hiding the information. Answer : C	1	2	3	2	2.6.1
18	How many times the for loop in the Bellmann Ford Algorithm gets executed? A. V times B. V-1 C. E D. E-1 Answer :B	1	1	3	1	1.6.1
19	Which is the example of path vector protocol? A. BGP B. IGMP C. ICMP D. HTTP Answer :A	1	1	3	1	1.6.1
20	In distance vector routing, If a router is connected to three networks , its original table contains ____entries A. 1 B. 2 C. 3 D. 4 Answer : C	1	1	3	1	1.6.1

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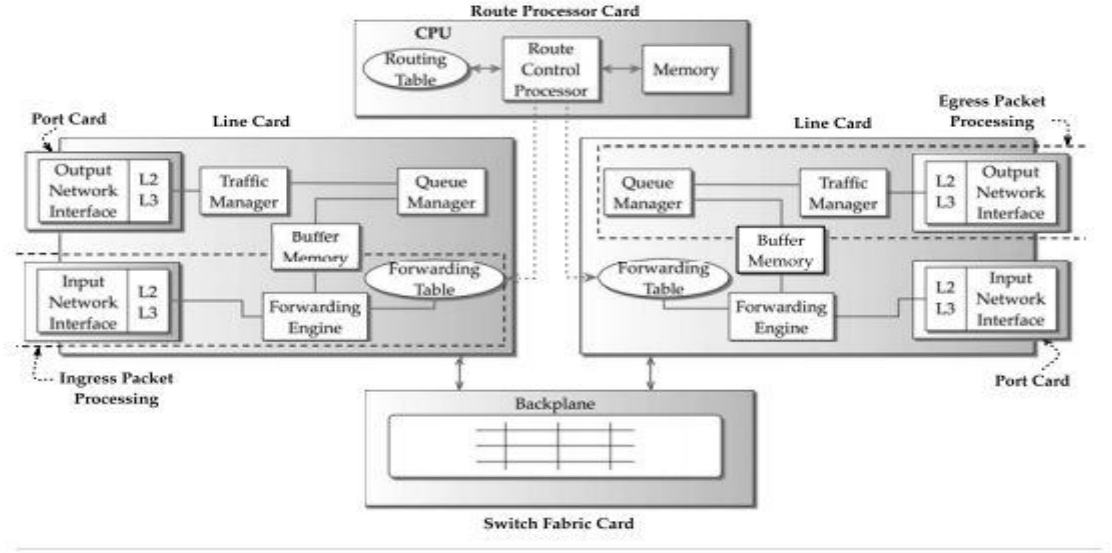
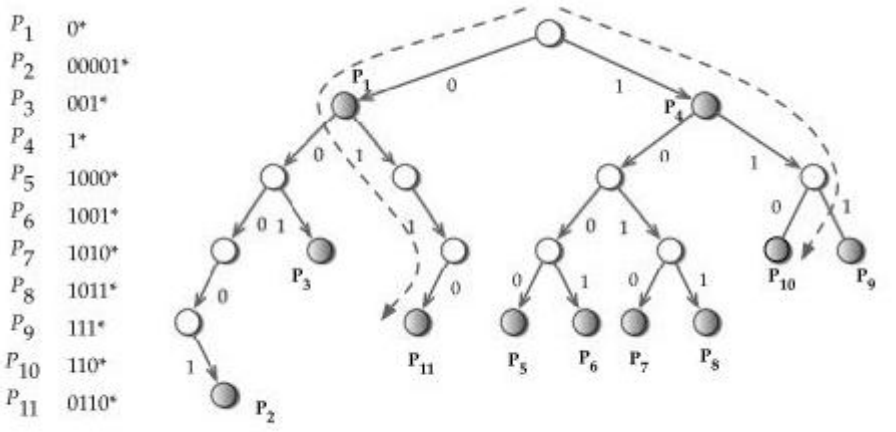
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

	Part – B **(2x5 = 10 Marks)**
21	Compare different types of Routers Three types of routers: • Core Routers • Edge Routers • Enterprise Routers
	(OR)
22	Analyze about packet flow in router with neat diagram Analyze: 2 Marks Diagram : 3 Marks
23	Discuss about Shortest Path and Widest Path with example Explanation : 3Marks Example : 2Marks
	(OR)
24	Explain about Distance Vector Routing Protocol with example Discuss about link state routing algorithm with example Explanation : 3Marks Example : 2Marks
	Part – C **(2x10 = 20 Marks)**
25	Draw and Explain architectural Components of a Router Explanation : 5 Marks Diagram : 5 Marks

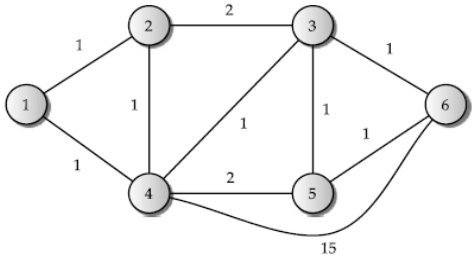


(OR)

26 How to Delete P11 node in the below Binary ties? Explain with diagram.
Explanation : 5 marks
Diagram : 5 Marks



27

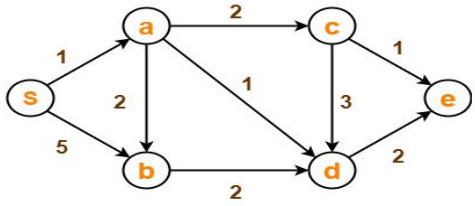
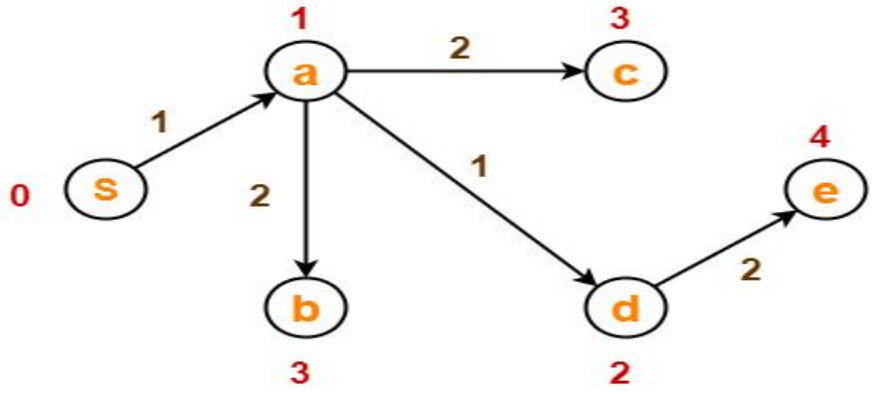


Compute the shortest path from node 1 to all using Bellman–Ford algorithm.

TABLE Minimum cost from node 1 to other nodes

h	$\overline{D}_{12}^{(h)}$	Path	$\overline{D}_{13}^{(h)}$	Path	$\overline{D}_{14}^{(h)}$	Path	$\overline{D}_{15}^{(h)}$	Path	$\overline{D}_{16}^{(h)}$	Path
0	∞	–	∞	–	∞	–	∞	–	∞	–
1	1	1-2	∞	–	1	1-4	∞	–	∞	–
2	1	1-2	2	1-4-3	1	1-4	3	1-4-5	16	1-4-6
3	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6
4	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6
5	1	1-2	2	1-4-3	1	1-4	3	1-4-5	3	1-4-3-6

(OR)

28	Using Dijkstra's Algorithm, find the shortest distance from source vertex 'S' to remaining vertices in the following graph  Answer : 

***Performance Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

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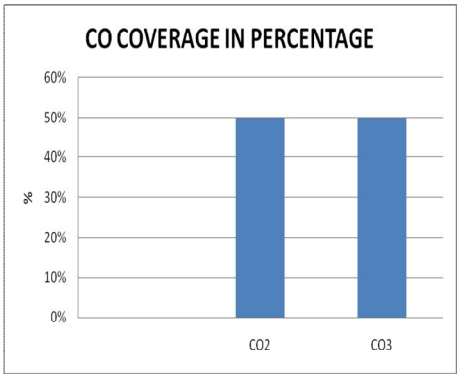

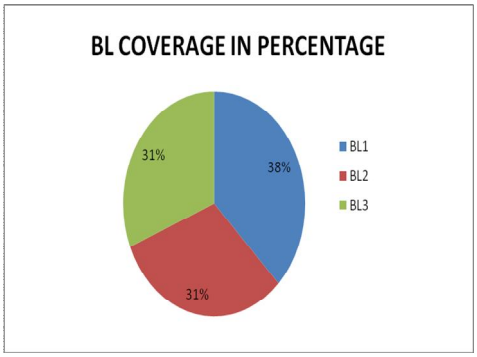

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SET 4

Answer key

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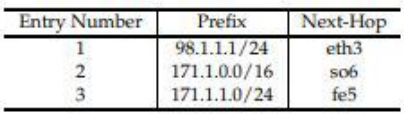
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

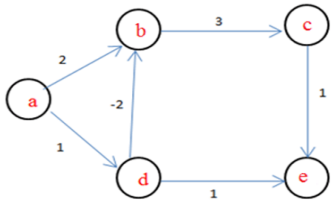
Part - A
(20x 1 = 20 Marks)

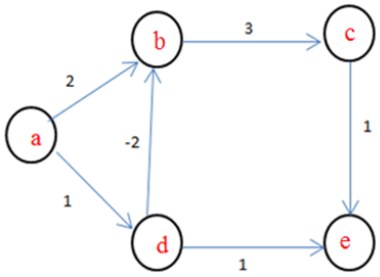
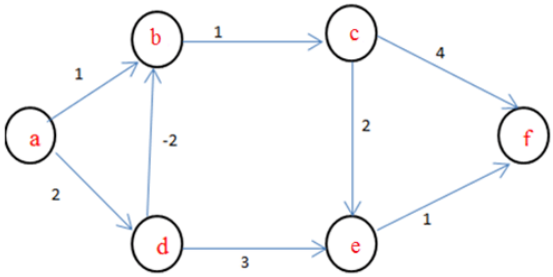
Instructions: Answer any 10

Q. No	Question	Marks	BL	CO	PO	PI Code
1	From the below list select the various routing protocols i. OSPF ii. BGP iii. RIP iv. PPP A. i B. i,ii C. i,ii,iii D. i,ii,iii,iv Answer : C	1	1	2	1	1.6.1
2	A _____ is a device that forwards data that is not explicitly destined to it. A. Hub B. Switch C. Router D. Bridge Answer : C	1	1	2	1	1.6.1
3	The routers must decrement the ____ field A. TTL B. checksum C. Version D. Padding Answer : A	1	1	2	1	1.6.1

4	Find the elements of router from the below list. i. Forwarding Engines ii. Queue Manager iii. Traffic Manager iv. Backward Engines A. i B. i,ii C. i,ii,iii D. i,ii,iii,iv Answer: C	1	1	2	1	1.6.1
5	In a Shared CPU Architecture The packet is subsequently shaped by the_____ A. Forwarding Engines B. Traffic Manager C. queue manager D. Route Control Processor Answer : B	1	1	2	1	1.6.1
6	Which router architecture do this "offloads all the packet forwarding functions to the line cards" A. Shared CPU architecture B. Shared forwarding Engine Architecture C. Shared Nothing Architectures D. Clustered Architecture Answer :C	1	1	2	1	1.6.1
7	Routers forward a packet using forwarding table entries. The network address of the incoming packet may match multiple entries. How do routers resolve this? A. Forward it to the router whose entry matches with the longest prefix of the incoming packet B. Forward the packet to all routers whose network addresses match. C. Discard the packet. D. Forward it the router whose entry matches with the longest suffix of an incoming packet Answer :A	1	2	2	2	2.6.3
8	Classless Inter-domain Routing receives a packet with address 131.23.151.76. The router's routing table has the following entries Prefix Output Interface Identifier A. 131.16.0.0/12 3 B. 131.28.0.0/14 5 C. 131.19.0.0/16 2 D. 131.22.0.0/15 1 Answer : A	1	2	2	2	2.6.3
9	Consider the forwarding table at a router. A forwarding table.  If the destination address of the incoming packet is 98.1.1.2 .what is the output interface? A. 98.1.1.1 B. 171.1.1.1 C. 171.1.1.0 D. 172.1.1.1 Answer : A	1	2	2	2	2.6.3

Entry Number	Prefix	Next-Hop
1	98.1.1.1/24	eth3
2	171.1.0.0/16	so6
3	171.1.1.0/24	fe5

10	In a Binary Tries algorithm left branch of a node is labeled as _____ A. 0 B. 1 C. 10 D. 11 Answer : A	1	1	2	1	1.6.1
11	The Bellmann Ford algorithm returns _____ value. A. Boolean B. Integer C. String D. Double Answer :A	1	1	3	1	1.6.1
12	What is the basic principle behind Bellmann Ford Algorithm? A. Interpolation B. Extrapolation C. Regression D. Relaxation Answer:D	1	1	3	1	1.6.1
13	Dijkstra's Algorithm is used to solve _____ problems. A. All pair shortest path B. Single source shortest path C. Network flow D. Sorting Answer : B	1	1	3	1	1.6.1
14	Consider the following graph. What is the minimum cost to travel from node d to node c?  A. 1 B. 6 C. 2 D. 3 Answer : A	1	2	3	2	2.6.3
15	In distance vector routing, If a router is connected to three networks , its original table contains ____entries A. 1 B. 2 C. 3 D. 4 Answer : C	1	1	3	1	1.6.1
16	The first step in the naïve greedy algorithm is? A. Analyzing the zero flow B. Calculating the maximum flow using trial and error C. Adding flows with higher values D. Reversing flow if required Answer: A	1	2	3	2	2.6.3

17	Consider the following graph. What is the minimum cost to travel from node a to node c?  A. 5 B. 2 C. 4 D. 3 Answer : B	1	2	3	2	2.6.3
18	In the given graph, identify the path that has minimum cost to travel from node b to node f.  A. b-c-e-f B. a-d-e-f C. a-d-b-c-f D. a-d-b-c-e-f Answer: A	1	2	3	2	2.6.3
19	How many times the for loop in the Bellmann Ford Algorithm gets executed? A. V times B. V-1 C. E D. E-1 Answer :B	1	1	3	1	1.6.1
20	In distance vector routing, If a router is connected to three networks , its original table contains ____entries E. 1 F. 2 G. 3 H. 4 Answer : C	1	1	3	1	1.6.1

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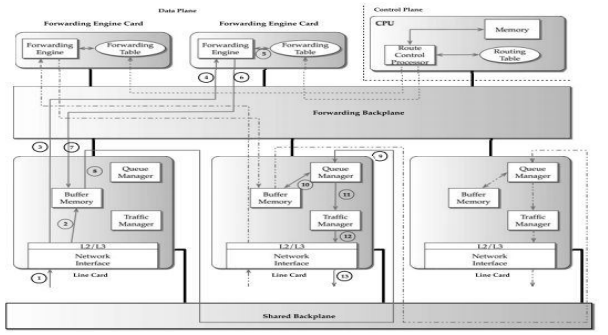
3	CO3	3	3	1	2	2	-	-	-	2	-	1	3	-	-	-
4	CO4	3	3	3	3	3	1	-	2	2	-	-	3	-	-	-
5	CO5	3	3	3	3	2	-	-	-	2	-	-	3	-	-	-
6	CO6	3	3	3	2	2	1	-	-	-	-	-	3	-	-	-

Part – B
(2x5 = 10 Marks)

21 Draw and Explain Shared Forwarding Engine Architecture.
Diagram: 3 Marks
Explanation: 2 Marks

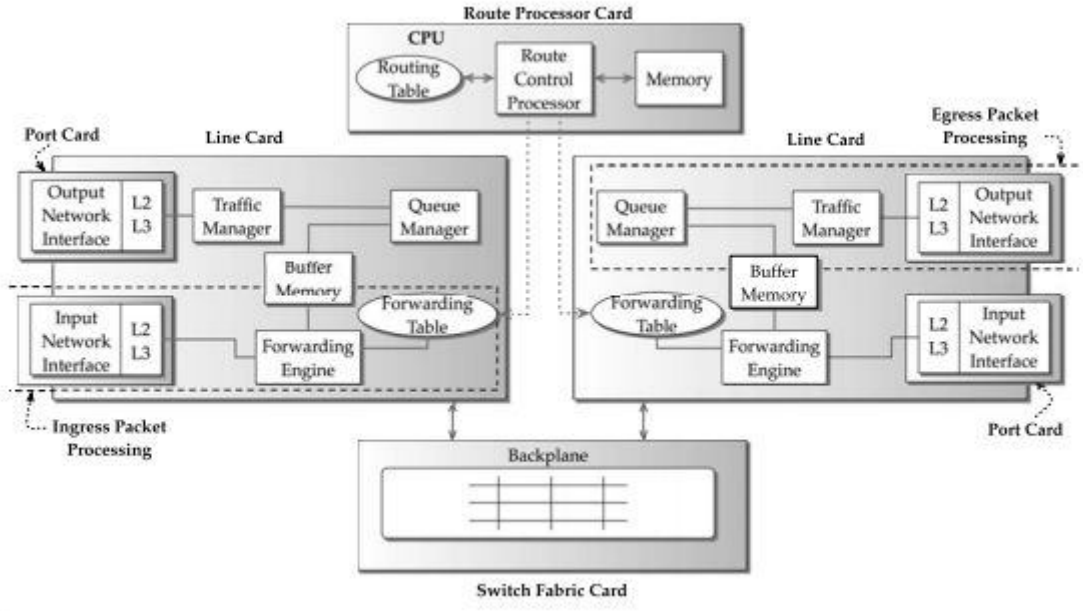


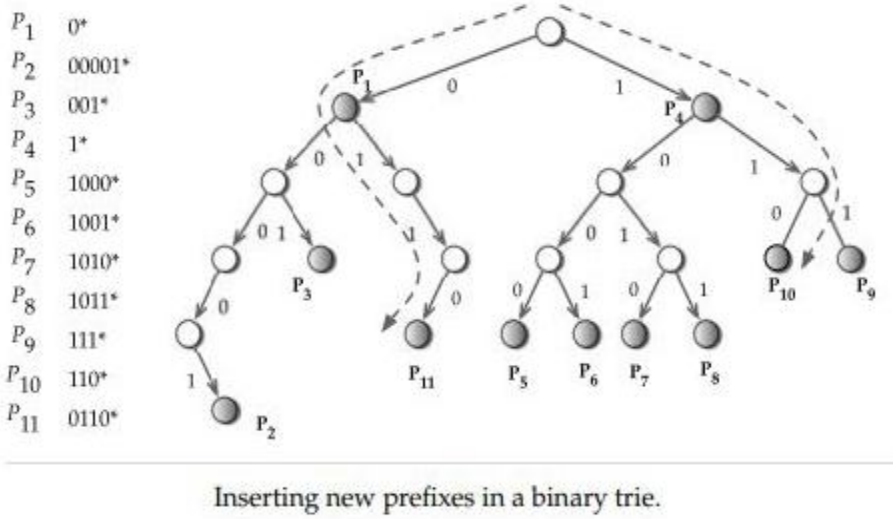
Shared forwarding engine architecture using two shared backplanes.

(OR)

22 Compare Routing Table versus Forwarding Table

Routing Table	Forwarding Table
The routing table is constructed by the routing algorithms based on the information exchanged between neighboring routers by the routing protocols.	The forwarding table, on the other hand, is consulted by the router to determine the output interface an incoming packet needs to be forwarded.
Each entry in the routing table maps an IP prefix to a next hop.	Each entry in the forwarding table maps an IP prefix to an outgoing interface
The routing tables are usually implemented in software	Forwarding table is implemented in a specialized hardware for high-speed routers.
The routing table indicates the next-hop IP address for a destination IP prefix.	The forwarding table tells us a packet bound to the network identified by the

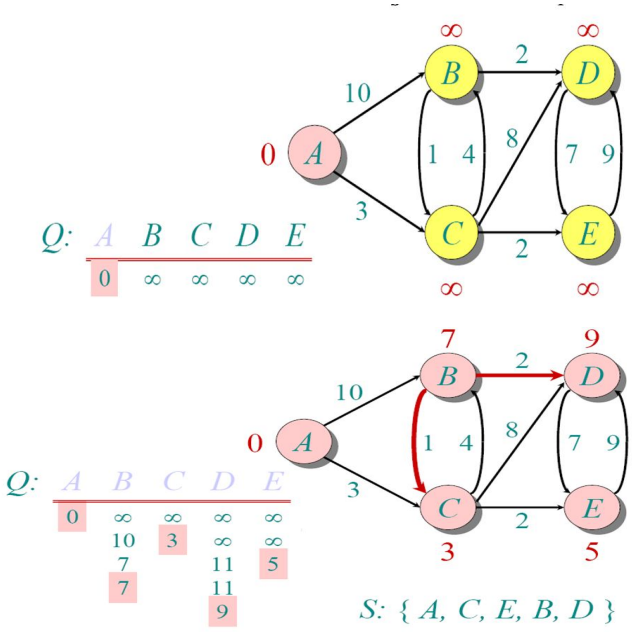
			IP prefix should be forwarded to interface eth0 with the appropriate MAC address.
		Routing table IP prefix | Next hop 10.5.0.0/16 | 192.168.5.254	Forwarding table IP prefix | Interface 10.5.0.0/16 | eth0
23	Elucidate Distance Vector Routing Protocol algorithm with example. Explanation : 3 Marks Example : 2 Marks		
	(OR)		
24	Explain link state Routing Protocol algorithm with example. Explanation : 3 Marks Example : 2 Marks		
	Part – C **(2x10 = 20 Marks)**		
25	Draw the router architectural components and explain each component in detail. Diagram -5 marks Explanation – 5 Marks • Network Interfaces • Forwarding Engines • Queue Manager • Traffic Manager • Backplane • Route Control Processor  		
	(OR)		
26	Insert the P12 node in the given below Binary tries. The address of P12 is 0111. After insert P12 node Draw the new tries and explain how to insert.		



Inserting new prefixes in a binary trie.

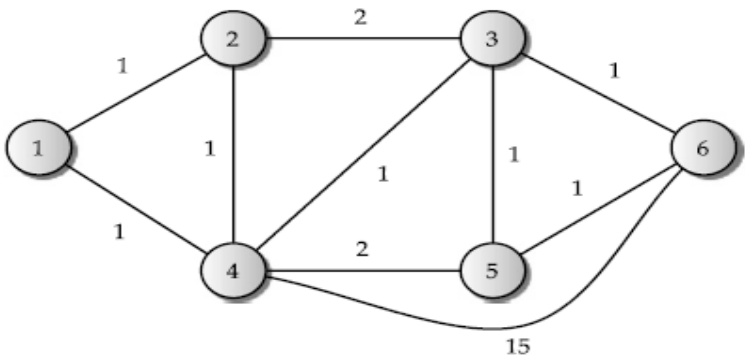
Explanation : 5 marks
Diagram : 5 Marks

27 Using Dijkstra's Algorithm, find the shortest distance from source vertex 'A' to remaining vertices in the following graph



(OR)

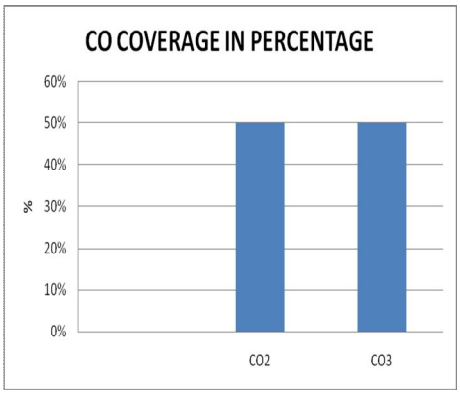
28

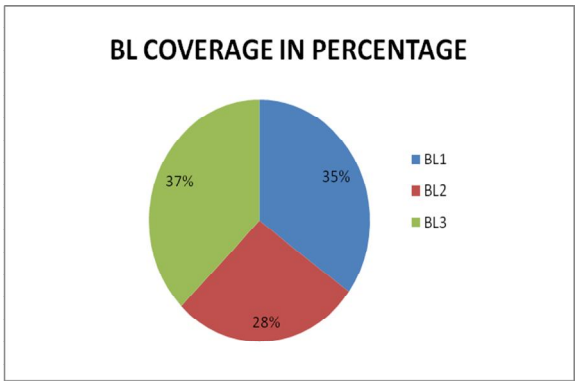


Compute the shortest path from node 2 to all using Bellman–Ford algorithm.
Steps : 5 Marks
Table : 5 marks

***Performance Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

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





Approved by the Audit Professor/Course Coordinator