

Final Assessment Test (FAT) - November/December 2023

Programme	B.Tech.	Semester	FALL SEMESTER 2023 - 24
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Rajesh Kumar	Slot	C1+TC1
		Class Nbr	CH2023240101180
Time	3 Hours	Max. Marks	100

Section A (8 X 10 Marks)

Answer all questions

01. A is downloading a picture shared by a friend B in a Google drive. Is A using 7 layers of OSI protocol or 5 layers of TCP/IP protocol suite? Explain your choice with needful diagrams and reasons. If your choice is for some other protocol, explain it with needful diagrams and functionalities. [10]

02. Explain the difference in functionalities between session and presentation layers. User A uses EBCDIC (Extended Binary Coded Decimal Interchange Code) and User B uses ASCII (American Standard Code for Information Interchange). Can User A communicate with User B using the protocol standards available? Explain with reasons the layer that can help A communicate with B in communication protocol? [10]

03. Consider the network shown in Fig1. Switch ports are numbered from 1,2,3,4. Two paths are drawn, one from A to F and the second from B to C. Each link is labelled with its Virtual Circuit Identifier (VCI) numbers. Path AF use VCIs 15,13, 7, 6, 10, 5 and BD use VCIs 8, 9, 11, 3. Construct switching tables for these two path establishment and explain your answer with a neat diagram. Switching table should have incoming outgoing ports and VCIs. [10]

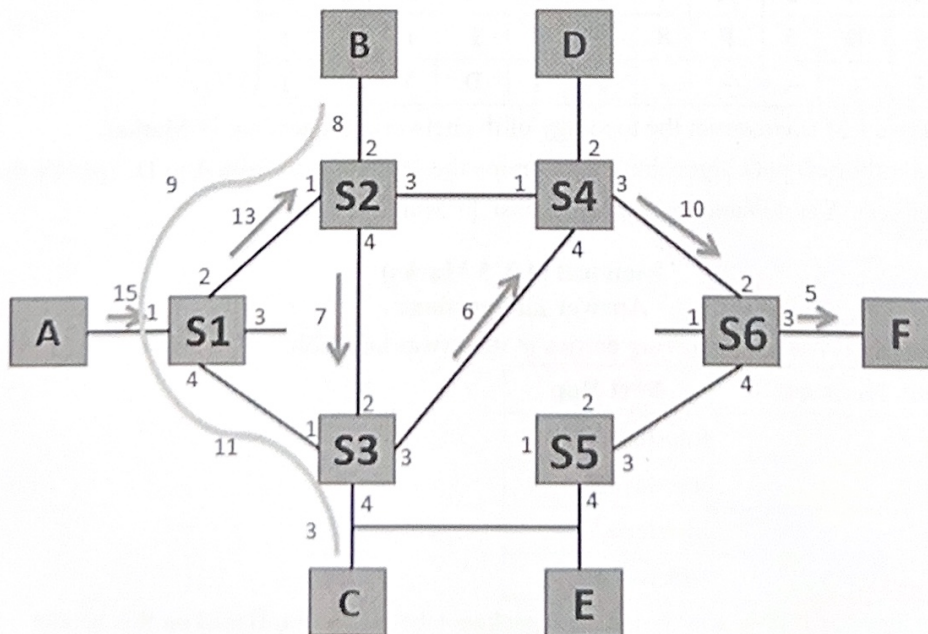


Fig 1

04. Encode the word "Hi" into odd parity hamming code, provided the ASCII value of A is 65 and the ASCII value of a is 97. [10]

(i) Write down the data transmitted. (5 Marks)

(ii) Suppose the 4th bit from the LSB is flipped, check and correct the error bit at the receiver end. (5 Marks)

05. Data communication takes place between Alice and Nian through TCP protocol, consider Alice as client and Nian as Server. Initial sequence number from Alice to Nian to establish connection is 4000, and from Nian to Alice is 11000. The data bytes from Alice to Nian ranges from 4001 to 6000. The window size is assumed to be 2 and Alice sends 1000 bytes during each transmission. Whereas the data bytes from Nian ranges from 11001 – 13000. Explain all stages of communication for the above said scenario in TCP with all the necessary diagrams with sequence numbers and flags. [10]

06. You are requested to support Adhish, who wants to create a message. Its performance should not get affected with packet loss, latency, jitter and throughput. For this purpose you are supposed to explain about the various congestion detection, congestion prevention mechanisms. Explain each of them in detail. [10]

07. A machine called lab1.cse.vit.ac.in exists in computer science department at VIT University and a user on eve.research.iitm.ac.in launches a query to resolve the name lab1.cse.vit.ac.in. We assume that none of the servers have the resolution of the name cached, thus all queries must be resolved and the final IP address must be obtained from the authoritative server in VIT University. Draw a picture that illustrates the query resolution process and explain the same. [10]

08. You are observing Link State Packets (LSPs) entering a router. [10]

Link State Packets:

	Router A		Router B		Router C		Router D		Router E		Router F	
Links	C	1	A	2	A	1	B	5	A	3	C	8
Links	B	2	D	5	F	8	E	3	F	1	E	1
Links	E	3	-	-	-	-	F	1	D	3	D	1

Based on the above LSPs, construct the topology of the network in question. [3 Marks]

Use the Dijkstra's shortest path algorithm to determine the shortest path from A to D. Specify the shortest path between A and D and its respective cost. [7 Marks]

Section B (4 X 5 Marks)

Answer all questions

09. Suppose some router R has the following entries in its forwarding table: [5]

Destination Network	Next Hop
160.0.129.0/24	Interface 0
10.0.4.0/22	Interface 1
128.140.0.0/16	Interface 2
0.0.0.0/0	128.140.0.1

The table below lists some IP header fields for 4 packets labeled P1–P4. Based on this header information, fill in the last column ("Destination") to indicate where router R forwards the packets — your answer should be one of the router's interface number, or "drop", if the router would drop the packet.

No	Source IP	Destination IP	TTL	Destination
P1	1.0.4.1	160.0.129.5	32	
P2	160.0.129.5	10.0.4.1	0	
P3	160.0.129.20	10.0.5.100	32	
P4	160.0.129.20	5.6.7.8	32	

10. Suppose you are creating a simple chat client that works over UDP. In your design, there is a centralized, well known chat coordinator that maps your friends' names to their IP address and port number; and you can then directly connect to them. The server has an API that clients can use upon starting, to register their presence: register (Name, IP address, and port number). Before talking to a friend, a client looks up the name, gets the IP address and port, and proceeds to connect directly to the friend. Now suppose Alice is behind a NAT, while Bob is not. They both register their IP addresses and desired port numbers with the server, and find that while Alice can connect (send message) to Bob, Bob cannot connect (send message) to Alice. Why can't Bob connect to Alice? [5]
11. Compare persistent and non-persistent HTTP connections to access the contents of a website. [5]
12. Illustrate the design of any application layer data transfer protocol with neat diagram. [5]

