



Final Assessment Test (FAT) - July/August 2023

Programme	B.Tech.	Semester	Fall Inter Semester 22-23
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
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		Class Nbr	CH2022232500371
Time	3 Hours	Max. Marks	100

Section A (6 X 5 Marks)

Answer All questions

01. For each of the following networks, determine the number of cables required and what would be the consequence if a cable fails? [5]
 - (i) Seven devices arranged in a mesh topology. How many ports are needed for each device?
 - (ii) Seven devices are arranged in a star topology (not counting the hub)
 - (iii) Seven devices arranged in a bus topology
 - (iv) Seven devices arranged in a ring topology
02. Compare Circuit Switching and Packet Switching with reference to call setup, physical path, bandwidth, congestion and transmission. [5]
03. The given message signal is 10101011 and the generator polynomial is $g(x)=x^3+x+1$, find the remainder and the encoded data sequence using Cyclic Redundancy Check. [5]
04. A block of 128 addresses is granted to a start-up company. We know that one of the addresses is 192.172.22.16/25. [5]
 - (i) What is the first address in the block?
 - (ii) What is the last address in the block?
05. List the routing tables entries of Local router as shown in Fig. 1 [5]

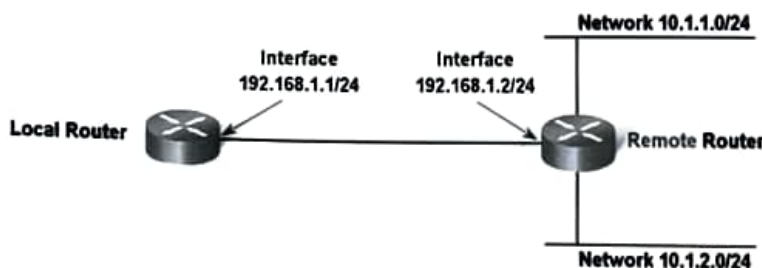


Fig 1

06. TCP opens a connection using an Initial Sequence Number (ISN) of 12,001. The other party opens the connection with an ISN of 10,001. Illustrate the TCP handshakes between the two parties during the connection establishment. [5]

Section B (7 X 10 Marks)

Answer All questions

07. Fig 2 illustrates the layers of the TCP/IP reference model for communications. [10]

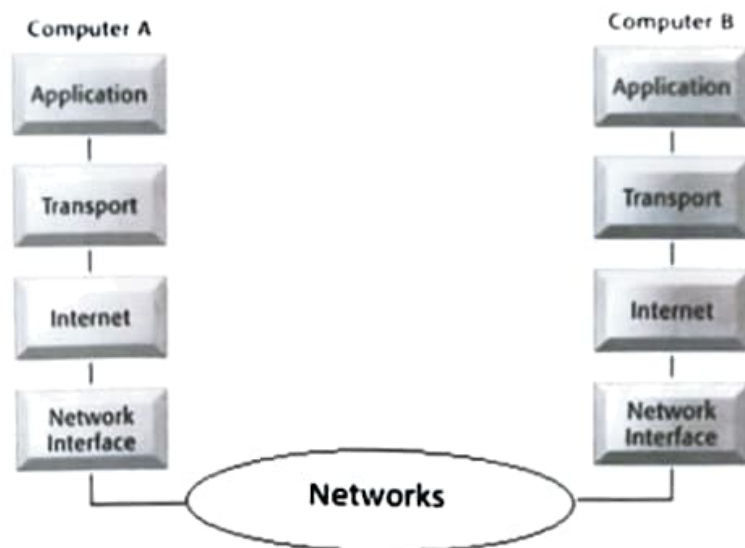


Fig. 2

Briefly Illustrate how the message(s) generated by Computer A's application is delivered to the Computer B's application over the internetwork by answering to the following questions in your illustration.

- Which communication layer helps to find the destination node on the internet? What do they do to deliver the packets?
- If a message packet is lost, which communication layer is taking care of the lost packet? How does it operate to recover the lost packet?
- Complete the following table by specifying the address type for each layer of the TCP/IP Model and the name of the PDU (protocol data unit).

Layer	Protocol Data Unit	Address	Example of Address
Application			
Transport			
Network			
Data Link			
Physical			

- Assume that processing delay, queuing delay and control overhead-bits are ignored. Consider the message size as 30,000bits, the propagation time is 10ms per hop and packet length is 1000 bits and link rate per hop 10000 bps and call set up time is 2ms. Find the total time for both the circuit and packet switching networks when number of intermediate nodes as (i) 5, (ii) 10, (iii) 15, (iv) 20. Analyze the impact of increasing the number of intermediate nodes on the total delay in both circuit and packet switching networks. Provide comments on the network performance in terms of total delay. [10]
- Using the Go-Back N protocol, illustrate with a flow diagram if a sender with a window size 3 and has six data frames to send. Label all the data frames with the Sequence Numbers and returning ACKs with the corresponding numbers. [10]
 - Assume no frame is lost during transmission. Show how the window slides over as acknowledgements arrive and new frames are transmitted, when operated under Go-Back N protocol.

(ii) Redo the problem (i) showing what happens when the 2nd data frame transmission (SN=1) is lost.

10. Given a classless IPv4 Block **160.110.96.0/23**. Design subnetting scheme for the topology shown in Fig 3. You must subnet the block as specified in Table 1 since each LAN or WAN requires enough IP addresses to support the number of hosts. [10]

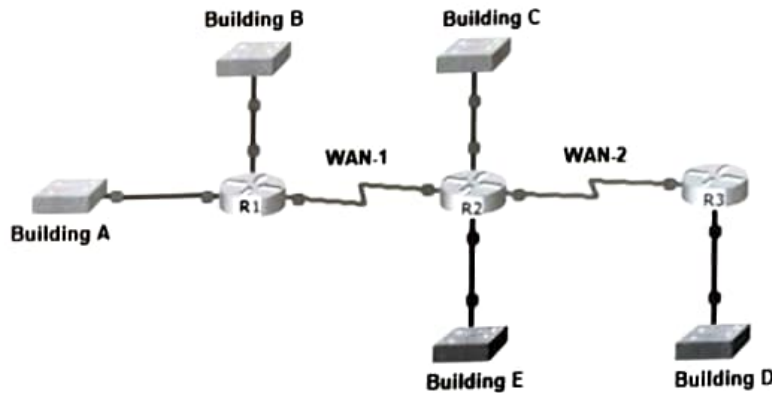


Fig. 3

Table 1 : Requirement of Number of Address

Building	Number of Addresses
Building A	200
Building B	100
Building C	50
Building D	20
Building E	10
WAN-1	2
WAN-2	2

Present the solutions in the form of table showing each subnet block, the subnet prefix, the range of addresses in that subnet block and analyze number of addresses wasted in that subnet block

11. For the network shown in Fig. 4, find the shortest path between source 1 to all other nodes using Dijkstra's algorithm. [10]

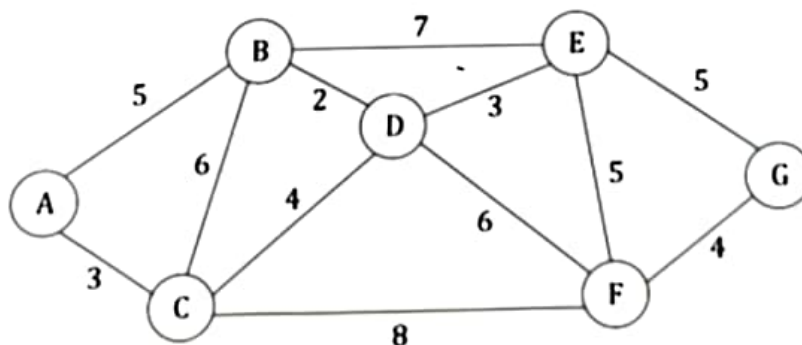


Fig. 4

12. (i) Explain with a neat diagram the three way handshake process during the connection establishment phase of the connection-oriented transport layer protocol. [5 marks] [10]

(ii) Compare and contrast the Transport Layer protocols TCP and UDP. Include key characteristics, features, and use cases for each protocol. **[5 marks]**

13. (i) What happens behind the process when you enter http://chennai.vit.ac.in in web-browser? **[2 marks]** **[10]**

(ii) If a DNS domain name is sense.chennai.vit.ac.in. **[3 marks]**

(a) How many labels are involved here?

(b) Is it a Fully Qualified Domain Name (FQDN) or Partially Qualified Domain Name (PQDN)?

(c) Name the domain type.

(iii) Differentiate Iterative Resolution versus Recursive Resolution schemes in DNS **[5 marks]**

