VIT Vellore Institute of Technology

Reg. No.

Final Assessment Test (FAT) - July/August 2023

Programme	B.Tech.	Semester	Fall Inter Semester 22-23
Course Title	COMPUTER NETWORKS	Course Code	BCSE308L
Faculty Name	Prof. Jaya Vignesh T	Slot	C2+TC2
		Class Nbr	CH2022232500375
Time	3 Hours	Max. Marks	100

Part - A (6 X 5 Marks)
Answer All questions

01. Enlist the different types of network topologies and discuss in detail about any two with neat illustrations. [5]

02. Differentiate packet switching from circuit switching. For voice traffic which switching technique is more suitable, discuss with respect to QoS. [5]

03. A network using Carrier Sense Multiple Access with Collision Detection (CSMA/CD) has a bandwidth of 10Mbps. If the maximum propagation time (including the delay in the devices and ignoring the time needed to send a jamming signal) is 25.6μs, what is the minimum size of the frame? [5]

04. (i) Change the following IPv4 addresses from binary notation to dotted-decimal notation -> **01111111 11110000 01100111 01111101** (1 Mark) [5]
(ii) Change the following IPv4 addresses from dotted-decimal notation to binary notation -> **129.14.6.8** (1 Mark)
(iii) Show the shortest form of the following IPv6 address -> **2340:0000:0000:0000:0000:119A:A001:0000** (1 Mark)
(iv) Show the original (unabbreviated) form of the following IPv6 address **0:1234::3** (2 Marks)

05. Compare and Contrast the Distance Vector and Link State Routing Approach. [5]

06. Suppose a Transmission Control Protocol (TCP) connection is transferring a file of 5000 bytes. The first byte is numbered 10,001. What are the sequence numbers for each segment if data are sent in five segments, each carrying 1000 bytes. [5]

Part - B (7 X 10 Marks)
Answer All questions

07. If you would like to take up a job profile as either a network architect or design engineer or support engineer or network admin or tester, you are required to provide services and solutions at any layer. Justify that you are eligible to take up that role by elaborating on the functionalities and services provided by ISO standardized OSI model, with neat illustration. [10]

08. Consider 6 hops (point-to-point links) between two terminal nodes; Transmission rate 9600 bps on all links; 1ms per-hop signal propagation delay. 1 second for call set-up time for circuit switched connection across 6 hops; message size 10000 bits; each packet size 2048 bits (2000 bits for message and 48 bits for overhead [Header + Trailer]). Find total time delay for both the circuit and packet switching networks. [10]

09. Using the Selective Repeat protocol, draw a flow diagram of a sender with a window size 4 and has six data frames to send. Label all the data frames with the Sequence Numbers (SNs) and returning ACKs with the corresponding numbers. [10]

(i) Assume no frame is lost during transmission. Show how the window slides over as acknowledgements come in and new frames are transmitted, when operated under Selective Repeat protocol.

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

10. You are a network engineer of an organization that has 3 business units (or departments): Engineering, Finance and Administration. [10]

You need to buy a block of IP Addresses in order to provide Internet connectivity to the organization's network. Each business unit forms a separate subnet. The Engineering unit needs 120 IP Addresses, the Finance units needs 60 addresses and the Administration unit needs 30 addresses. The 3 subnets are connected via an access router as shown in Fig. 1. The ISP assigned your network a classless block "128.64.0.0/24".

(i) Find the total number and range of addresses allotted to your organization. (2 Marks)

(ii) Find the range of address allotted for each of your business unit along with it's subnet prefix/mask. (6 Marks)

(iii) Analyze the unallocated address left after your allocation to the business units. (2 Marks)

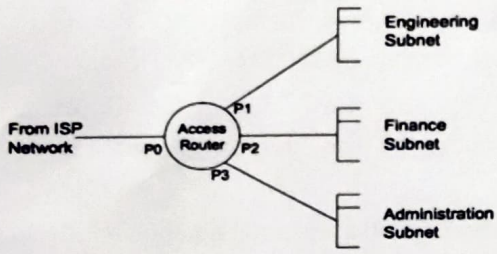

Fig. 1

11. Interpret Fig. 2 comprising of several networks interconnected by routers. Routing Information Protocol (RIP) is enabled in these routers. What will be the initial table of R1 and after enabling RIP, Compute the routing table of **Router R1** and illustrate the process carried out by RIP. [10]

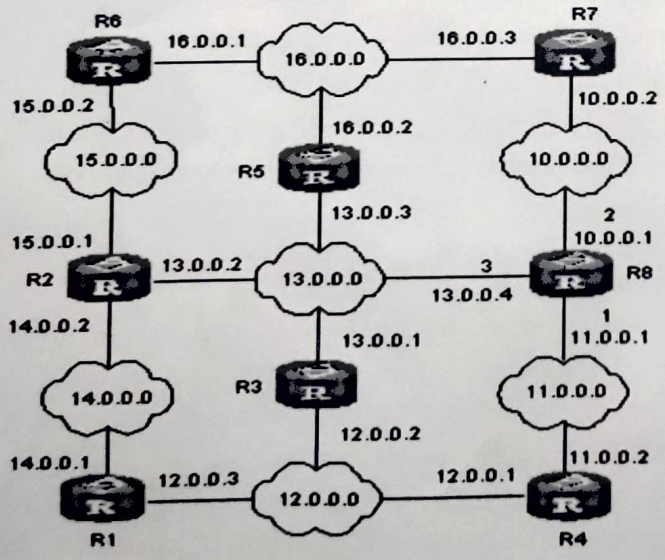

Fig. 2

12. Explain with necessary diagrams how Transmission Control Protocol (TCP) uses the congestion control to alleviate congestion in the network. Also, interpret the Fig.3 graph of congestion window size (x-axis) as a function of transmission round (y-axis). [10]

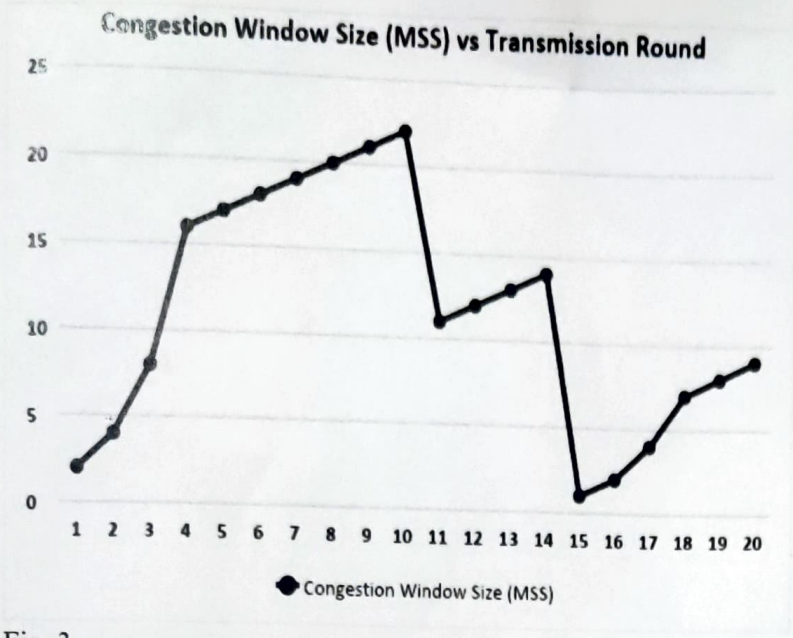

Fig. 3

13. (a) Illustrate the Hypertext Transfer Protocol (HTTP) transaction between the client and server and illustrate for the following cases (6 marks) **[10]**

i) The client wants to retrieve a document from the server. Use the appropriate method.

ii) The client wants to send data to the server. Use the appropriate method.

(b) Which transport layer service does HTTP use? Differentiate various connection modes of operation used by HTTP. (4 marks)