VIT
Vellore Institute of Technology

Reg. No. :

Final Assessment Test (FAT) - APRIL/MAY 2023

Programme	**B.Tech**	Semester	**Winter Semester 2022-23**
Course Title	**COMPUTER NETWORKS**	Course Code	**BCSE308L**
Faculty Name	**Prof. Dinakaran M**	Slot	**F1+TF1**
		Class Nbr	**CH2022235000724**
Time	**3 Hours**	Max. Marks	**100**

Section-1 (10 X 10 Marks)
Answer All questions

01. (i) Suppose, if there is a change in the service provided by one layer of OSI; For e.g. layer 3, will that effect layer 4 and layer 2? Justify your answer (3 marks). [10]

ii) Mention the purpose of having the international standards for network protocols? Defend it in a positive and negative way. (3 marks).

iii) Bridges work best where traffic from one segment of a network to other segments is not too high. Mention the types of network traffic problems a bridge is incapable to solve. Explain. (4 marks).

02. User A wants to design one network lab with 70 systems and a Server. Help user A by exploring the possible ways in structuring the lab with all its merits and demerits. Also, list out all the possible networking devices needed for the lab to function properly. [10]

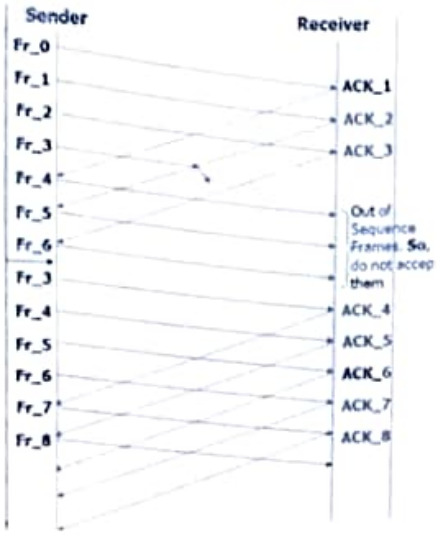
03. Compute the latency for a data packet of size 1070 bytes by considering the below given communication mediums. The network has bandwidth of 12 Mbps, the distance is 1700 km, and there are two nodes before destination. Each node takes 300 microseconds for processing and forwarding a packet. Identify the components of latency and respective delays. Clearly state and assume value for any data required for the computation. The propagation speed of communication medium, [10]

- a copper cable is 2.3×10^8 m/s
- an optical Fiber is 2.0×10^8 m/s

04. (i)Solve the following using Cyclic Redundancy Check (CRC) in both sender side and receiver side. Message (M) = 1010001101 Divisor (D) = 110101 (8 Marks) [10]

(ii) If suppose m is the number of message bits and r is the number of redundant bits, the error correction method should satisfy the equation: $2^r \geq m + r + 1$ to find the errors. So the hamming code error correction technique uses 4 redundant bits for detecting the errors in 7 message bits. Discuss why you will not be able to detect the errors in the above scenario with 3 redundant bits. (2 marks)

05. Identify the flow control mechanism used in the following scenario and mention the disadvantages. Suggest alternative protocol that could overcome the limitations. Explain the response of the suggested protocol for the given scenario with a neat diagram. [10]



[10]

06. Consider the following (hexadecimal) values in an IP header.

Version: 4

HLEN: 5

ToS: 0

Total length: 28

Identification bit: 1

Flag: 0

Fragmentation offset: 0

TTL: 4

Protocol: 6

Source IP: 10101211

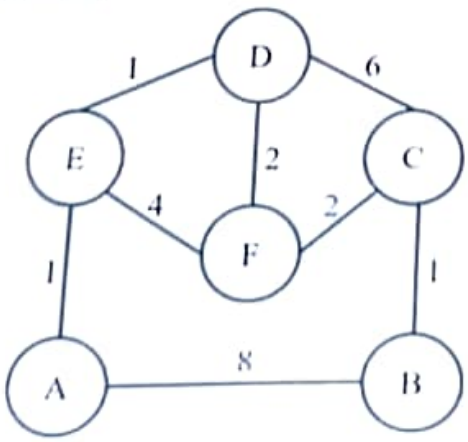
Destination IP: 14020301

Calculate the checksum (hexadecimal Value) and explain the verification at the receiver side. [10]

07. Assume two organizations A & B need some IP addresses for their systems from the available chunk 138.101.114.250/20. Consider yourself as the in charge of ISP and allocate 500 available IP addresses to A and 300 of the available addresses to B. The rest is kept reserved.

- Find the first and last address of the organization A and B. (4 marks)
- Calculate the number of valid hosts in each organization. (3 marks)
- Determine the remaining address after allocation. (3 marks)

08. Consider the given sample network. [10]



Construct the Routing table for node 'A' by applying Dijkstra's algorithm.

09. Suppose you are a software engineer who is working on developing a new application that uses the TCP protocol to transfer data between a client and a server. You are tasked with designing the TCP header for this application. What fields would you include in the TCP header and explain. Also would you include any options in the header, and if so, which ones and why? Additionally, how would you ensure that the TCP header provides enough information to reliably transfer data between the client and the server? [10]

10. You are a technical support representative for a web hosting company. A customer has contacted you to report a problem in accessing their website from their computer. You suspect that the issue might be related to the DNS resolution. How would you explain the DNS protocol to the customer and the role it plays in accessing their website? Describe the steps involved in the DNS resolution process, and how does it work to translate domain names into IP addresses? [10]

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