



# VIT

**Vellore Institute of Technology**  
(Deemed to be University under section 3 of UG Act, 1956)

**Continuous Assessment Test II – March 2024**

Programme	: B.Tech (ECE)	Semester	: WS 2023-24
Course	:  Computer Communications and Networks	Code	: BECE401L
		Class Nbr	: CH2023240502624 CH2023240502629 CH2023240502631 CH2023240502627 CH2023240502622
Faculty	: Dr. Jayavignesh T, Dr. Kalaivanan K Dr. Nitish Katal, Dr. Saranya Nair, Dr. Sivakumar S	Slot	: D1+TD1
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the questions

**Questions**

Q.No.
Sub.
Marks

Sec.

I.

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sequenceDiagram
    participant A as Station A
    participant B as Station B
    A->>B: Frame 1
    B-->A: ACK 2
    A->>B: Frame 2
    B-->A: ACK 3
    A->>B: Frame 3
    B-->A: ACK 4
    A->>B: Frame 4
    B-->A: ACK 5
    A->>B: Frame 5
    B-->A: ACK 6
    A->>B: Frame 6
    B-->A: ACK 7
    A->>B: Frame 7
    B-->A: ACK 8
    A->>B: Frame 8
    B-->A: ACK 9
    A->>B: Frame 9
    B-->A: ACK 10
    A->>B: Frame 10
    B-->A: ACK 11
    
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Retransmission

No. of attempt 1

Fig. 1

Station A needs to send a message consisting of 10 frames to station B using a sliding window (window size 4) and the new customized ARQ protocol as shown in Fig. 1.

All frames are ready and immediately available for transmission. Station A does the retransmission due to the ACK lost, frame lost and timeout. Answer the following questions based on your interpretations from Fig. 1.

- (i) How does the sliding window operate after every transmission? Illustrate in the given timeline diagram. [4 marks]
- (ii) When the frames arrive out of sequence, how does Station B handle the sliding window on the receiver side? [2 marks]
- (iii) Why is the sender side timer necessary? [2 marks]
- (iv) What is the total number of frames that A will transmit for sending the message to B? [2 marks]

The network consists of 4 hosts distributed as shown in Fig. 2.

Assume this network uses CSMA/CD and signal travels with a speed of  $3 \times 10^8$  m/sec.

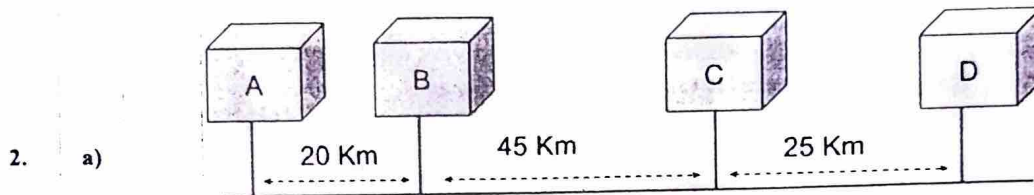


Fig. 2

- (i) If the sender sends at 1 Mbps, what could be the minimum size of the frame? [4 marks]

- (ii) What would happen if the size of the frame is less than as obtained in part (i)? [2 marks]

- b) CSMA/CD employs a backoff strategy after a collision is detected. Describe the concept of exponential backoff. How does this strategy help to prevent further collisions? [4 marks]

3. a) Consider an IEEE 802.5 network composed of 100 stations such that the stations are separated by a distance of 120 meters with 2.5 bits of delay at each interface. Each station in the network has a data frame of 80 bytes to transmit. Assume that there are no losses in the network and if the propagation speed in the network is  $2 \times 10^8$  meters/sec and the data rate of the Token Ring is 16 Mbps, then [6 marks]

- (i) Calculate the ring latency for this token ring network. [2 Marks]

- (ii) Discuss in brief the process of token passing in the network using different reinsertion strategies and hence find the efficiency. (Assume the header size as 15 bytes) [4 Marks]

Interpret the problem that can happen as shown in Fig. 3, where A, B & C are wireless mobile stations and A & C are trying to communicate simultaneously to same station B using carrier sensing mechanism. Suggest the suitable mechanism to mitigate this problem. [4 Marks]

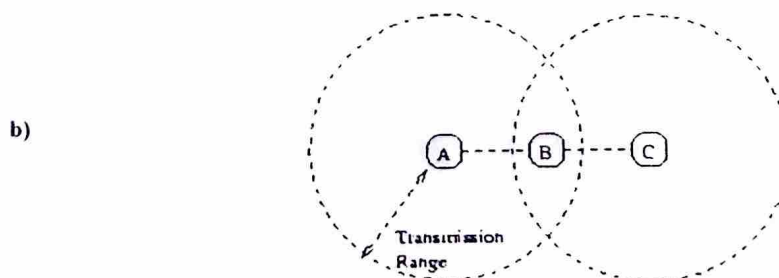


Fig. 3

(i) Consider an IPv4 network which uses classful addressing. Given one of the addresses as 192.168.10.3. Determine the following:

- (A) The class that given address belongs to [1 mark]
- (B) The Network mask in decimal and CIDR notation [1 mark]
- (C) The first address in the block [1 mark]
- (D) The last address in the block [1 mark]

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(E) If the network contains 115 hosts, how many addresses are unused? [1 mark]

(ii) Find the network address if one of the addresses in a classful block is 32.16.15.117 [2 marks]

(iii) An organization with 12500 customers required to be allocated with unique IPv4 addresses and assume that the organization uses classful addressing. The region's ISP costs Rs. 1,25,000/- for a class B block and Rs. 3,000/- for a class C block. What would you suggest for the organization to buy? and justify. [3 marks]

You are a network engineer of an organization that has 3 business units (or departments): Engineering, Finance and Administration. 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 30 addresses and the Administration unit needs 20 addresses. The ISP assigned your network a classless block "72.16.1.0/24".

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(i) Find the total number of addresses allotted to your entire organization. [2 marks]

(ii) Find the range of address allotted for all the 3 units along with it's subnet mask. [6 marks]

(iii) How many addresses are left unused in the classless block? [2 marks]

