Reg. No.:

Name :

VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test 2 – June 2023

Programme	:	B.Tech (Electronics and Computer Engg)	Semester	:	FIS 2022-23
Course	:	Computer Networks	Code	:	BCSE308L
			Class Nbr	:	CH2022232500375, CH2022232500377, CH2022232500378, CH2022232500376, CH2022232500379
Faculty	:	Dr.Jayavignesh T, Dr.Kalaivanan K, Dr.Markkandan S, Dr.Vijayakumar P, Dr.Vydeki D	Slot	:	C2+TC2
Time	:	90 Minutes	Max. Marks	:	50

Answer ALL the questions

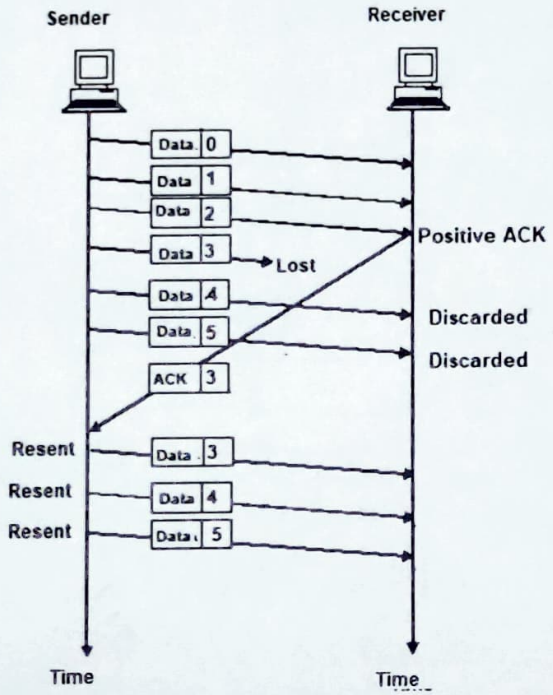
Q.No.	Sub. Sec.	Questions	Marks
1.			[15]

Fig 1

i. Identify the ARQ protocol in operation for the scenario shown in Fig 1. **[1 mark]**

ii. What could have been the minimum window size and the number of bits used for sequence numbering for this above scenario? **[2 marks]**

iii. Briefly explain the case(s) that happened in the scenario shown in above Fig 1. How did this ARQ protocol handle these case(s)? **[2 marks]**

iv. Instead of the ARQ protocol used in the above Fig 1, if it is replaced with a ARQ protocol that handles it better in this noisy channel, how would it have handled the same situation? **[5 marks]**

v. Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols? **[5 marks]**

   I. Stop and Wait ARQ

   II. Go-Back N ARQ

III. Selective Repeat ARQ

A pure ALOHA network transmits 100-bit frames on a shared channel of 100 kbps. What is the throughput if the system (all stations together) produces **[5 Marks]**

a) a. 100 frames per second
b. 400 frames per second
c. 300 frames per second

[10]

b) Consider a wired network following the CSMA/CD protocol for medium access. Two nodes, A and B, are trying to transmit data frames simultaneously. The parameters for the system are:

2.

- Data frame size = 1500 bytes
- The data rate = 10 Mbps
- Distance between nodes A and B = 2000 meters
- Signal propagation speed = $2*10^8$ meters/second

Calculate the minimum size of the frame that needs to be used by the network to effectively use CSMA/CD. Also, calculate how long it will take for a collision to be detected by node A. **[5 Marks]**

3.

a) Find the class of the classful IP address = **200.36.2.3 [1 mark]**

b) Rewrite the following IP address using the dotted decimal notation **[1 mark]**
10001001100011101101000000110001

c) Change the prefix length n=14 to a mask in dotted decimal notation. **[1 mark]**

d) Write the IP address 135.1.1.25 mask 255.255.248.0 in CIDR notation. **[1 mark]**

[10]

e) You have been allocated a class C network address of 211.1.1.0 and are using the default subnet mask of 255.255.255.0. How may effective hosts can you have? **[2 marks]**

f) Find the first and last address for the following blocks **[4 marks]**
i) 70.110.19.17/16
ii) 14.12.72.8/18

4.

You are tasked with designing a network for a medium-sized company that has multiple departments with varying host requirements. The company has been assigned a block of IP addresses with a Classless Inter-Domain Routing (CIDR) notation. Your goal is to allocate appropriate subnets to each department and determine the range of usable IP addresses for each subnet.

Given: Company's IP Address Block: 203.0.112.0/~~23~~ /22

Department Requirements:

(i) IT Department: 200 hosts
(ii) Finance Department: 100 hosts
(iii) Sales Department: 80 hosts
(iv) Marketing Department: 50 hosts
(v) HR Department: 30 hosts

[15]

a) Find the total number of addresses allotted to the company
b) Find the range of address for every subnet and its subnet prefix
c) Analyse the unused addresses left in the classless block.