

Reg. No.:

Name :



VIT

Vellore Institute of Technology

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

Continuous Assessment Test I – May 2023

Programme	: B.Tech (ECM)	Semester	: Fall Inter Sem 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 V, Dr.Vydeki D	Slot	: C2+ TC2
Time	: 90 Minutes	Max. Marks	: 50

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.	a.	Identify one or more layers of the OSI model that carry out the following responsibilities and explain them in detail: i) Transmission of bit stream across physical medium. ii) Defines Frames. iii) Error correction and retransmission. iv) Reliable Process-to-process message delivery. v) Route selection. vi) Provides user services such as e-mail and file transfer.	[10]
	b.	Compare and contrast star and mesh topologies using suitable examples.	[5]
2.	a.	Assume that processing delay, queuing delay and control overhead-bits are ignored. Consider the message size as 30,000 bits, the propagation time is 10ms per hop, packet length is 1000 bits, transmission rate per hop is 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) 2, (ii) 5, (iii) 10, (iv) 50, (v) 100. Also, comment on the network performance in terms of the total delay in both the switching networks when the number of intermediate nodes increases.	[10]
	b.	Consider an Internet application running on two Internet hosts, Host1 and Host2, which are communicating using a path through router R. Assume that the average service time (queuing and processing delay) at R is 15 ms, packets are 6,000 bits long and the propagation delay between Host1 and Host2 is 250ms. Also, ignore the control overhead.	[3]

- (i) If the application running on Host1 and Host2 cannot tolerate latencies over 350ms, what is the minimum capacity of the link connecting the two hosts?
- c. Give an example of a delay-intolerant Internet application, and identify which switching network is suitable for a delay-intolerant application. [2]
- d. Compare the merits and demerits of packet datagram approach and circuit switching network. [5]

The Bluetooth and USB standards use CRC-16 polynomial for error detection in data communications. If the adopted CRC-16 Generator Polynomial $x^{16} + x^{12} + x^5 + 1$ is used for error detection, [10]

3. a.
- i) What is the number of check bits generated by this polynomial? [1 mark]
 - ii) Does it detect a single bit error? Defend your answer. [3 marks]
 - iii) What will be the probability of detecting burst error of size 14? [2 marks]
 - iv) What will be the probability of detecting burst error of size 17? [2 marks]
 - v) What will be the probability of detecting burst error of size 18? [2 marks]

Following Table 1 shows a block code C(n,k) generation scheme [5]

Dataword	Codeword
00	00000
01	01011
10	10101
11	11110

b.

- i) Prove whether this scheme is a linear block code or not.
- ii) Determine how the code word table is generated.
- iii) What is the minimum hamming distance of this scheme?
- iv) What is the error detecting and error correction capability of this scheme? Justify it with suitable examples.