VIT

Vellore Institute of Technology

School of Information Technology and Engineering

Fall Semester 2022-2023

Continuous Assessment Test - I

Programme Name & Branch: MCA

Course Name & code: Data Communication and Networking & ITA5003

Class Number (s): VL2022230105117, VL2022230106227, VL2022230105122

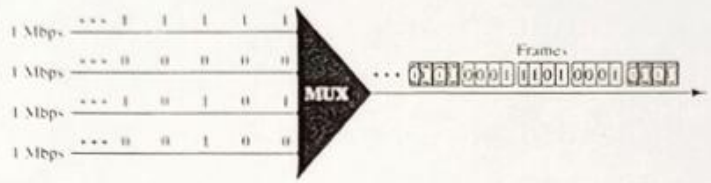
Slot: E2+TE2

Faculty Name(s): Dr.K.Santhi, Dr.M.Ramalingam, Dr.T.Senthil Kumar

Duration: 90 Min. Maximum Marks: 50

Answer all the questions

Q.No.	Question	Max Marks
1.	Assume that source and destination in the same network. One of the process in the source system wants to make a reliable communication to the one of the application in the destination system. Elaborate with the neat sketch on layer communication, protocol functionalities, encapsulation and de-capsulation happens at both sender and receiver side.	10
2.	a) For each of the following four networks, discuss the consequences if a connection fails. a. Five devices arranged in a mesh topology b. Five devices arranged in a star topology (not counting the hub) c. Five devices arranged in a bus topology d. Five devices arranged in a ring topology b) Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? c) Draw a hybrid topology with a star backbone and three ring networks	5 3 2
3.	a) Five channels, each with a 125-kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 20 kHz between the channels to prevent interference? Draw the schematic representation of the bandwidth allocation. b) A multiplexer combines four 100-kbps channels using a time slot of 2 bits. Show the output with four arbitrary inputs. What is the frame rate? What is the frame duration? What is the bit rate? What is the bit duration?	5 5
4.	a) A non-periodic composite signal has a bandwidth of 400 kHz, with a middle frequency of 140 kHz and peak amplitude of 20 V. The two extreme	5

	frequencies have an amplitude of 0 V. Draw the frequency domain of the signal b) A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network?	5
5.	a)  The above shows synchronous TDM with a data stream for each input and one data stream for the output. The unit of data is 1 bit. Find (1) The input bit duration (1 Marks) (2) The output bit duration (1 Marks) (3) The output bit rate (1 Marks) (4) The output frame rate (2 Marks) b) What are the propagation time and the transmission time for a 5-Mbyte message (an image) if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s.	5 5