

Reg. No.:

Name :



VIT

Vellore Institute of Technology

Continuous Assessment Test I – September 2023

Programme	: B.Tech. (CSE)	Semester	: Fall 2023-24
Course	: Computer Networks	Code	: BCSE308L
Faculty	: Dr. Deepa Nivetiha, Dr. Neelunarayanan V, Dr. Rajesh Kumar	Slot	: CI+TC1
Time	: 90 Minutes	Class Nbr	: CH2023240100901 CH2023240100902 CH2023240101180
		Max. Marks	: 50

Answer ALL the questions

Q.No. Sub.  
Sec.

Questions

Marks

a. In what way is the star topology more expensive than a bus or ring topology? [2 Marks]

b. If there are n devices (nodes) in a network, what is the number of cable links required for a fully connected mesh and star topology respectively? [3 Marks]

c. Justify the role of standards in networks. Compare and contrast OSI and TCP/IP. [3 Marks]

10

For each of the following operations on a remote file server, discuss whether they are more likely to be delay sensitive or bandwidth sensitive.

2.

- Open a file
- Read the content of a file
- List the content of the directory
- Display the attributes of a file
- Download the file

10

A secret data is sent by Mr. Edward to Mr. Jenna. Name three different switching techniques that can be used to send data. Elaborate the switching techniques with necessary diagrams. Recommend a switching technique for this activity.

10

A Satellite TV channel has a bandwidth of 1 MHz. With necessary formula, calculate the appropriate bit rate if.

10

- The signal to noise ratio of the channel is 63.
- The signal to noise ratio of the channel is 0.

- a. Find the CRC polynomial function for string 1000101001000001. [1 Mark]  
b. Convert and find the CRC for data 011001 using polynomial function  $x^7+x^3+1$ . [5 Marks]  
c. Compute 16-bit checksum for string "chandraya". ASCII value for "a" in decimal is 97. [4 Marks]

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Reg. No.: 20181136

Name : \_\_\_\_\_



### Continuous Assessment Test I – September 2023

Programme : B.Tech. (CSE)

Course : Computer Networks

Faculty : Dr. Pradeep Kumar TS,  
Dr. Subbulakshmi T,  
Dr. Muthumanikandan V

Time : 90 Minutes

Semester : Fall 2023-2024

Code : BCSE308L

Slot : F2+TF2

Class Nbr : CII2023240100688,  
CII2023240100687,  
CII2023240101172

Max. Marks : 50

**Answer All, the questions**

Q. Sub  
No. Sec

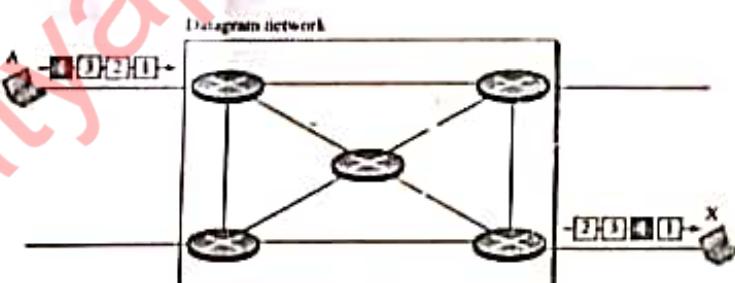
Questions

Mark  
s

1. Yahoo Inc. gives options for their employees to work from home and work from office option. Arun a quality analyst willing to take "Work from Home" option. So Yahoo Inc provided him credentials based on VPN (Virtual Private Network) connection. Arun works depends mainly on communicating through email and voice chat with the clients based on the support tickets. For this scenario, how Arun works deals with all the 7 layers in the OSI Model. 10

The following diagram shows a packet switched network where the packets are chunked in to 4 parts and at the receiving end, they were assembled together in a different order. Complete the diagram by making the chunks to pass through the datagram network. (NB: Use your imagination.). Also redraw the diagram for circuit switching and message switching.

2.



10

- A. A sender needs to send the four data items Ox3456, OxABCC, Ox02BC, and OxEEEE. Answer the following:

- Find the checksum at the sender site... ✓

3. ~~✓~~ Find the checksum at the receiver site if there is no error.: ✓
- Find the checksum at the receiver site if the second data item is changed to OxABCE, ✓
  - Find the checksum at the receiver site if the second data item is changed to Ox~~AB~~CE and the third data item is changed to Ox02BA. ✓

10



**Continuous Assessment Test I – September 2023**

Programme	B.Tech. (CSE)	Semester	Fall'23-24
Course	Computer Networks	Code	BCSE308L
Faculty	Dr. Deepa Nivethika, Dr. Neelanarayanan V, Dr. Kanchana Devi V	Slot	C2+TC2
Time	90 Minutes	Class Nbr	CH2023240100901 CH2023240100902 CH2023240101181
		Max. Marks	50

**Answer ALL the questions**

Q.No.	Sub. Sec.	Questions	Marks
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Imagine Amit sends a message to Roshan. The data travels 4 hops from Amit's computer to reach Roshan's computer.

1. a. How many end devices and how many intermediate devices are required for this data transfer? [2 Marks]

- b. Identify and justify, what are the addresses required by the end devices and intermediate devices? [2 Marks] 10

Draw the above-said scenario as a diagram along with the required ISO/OSI layers? [6

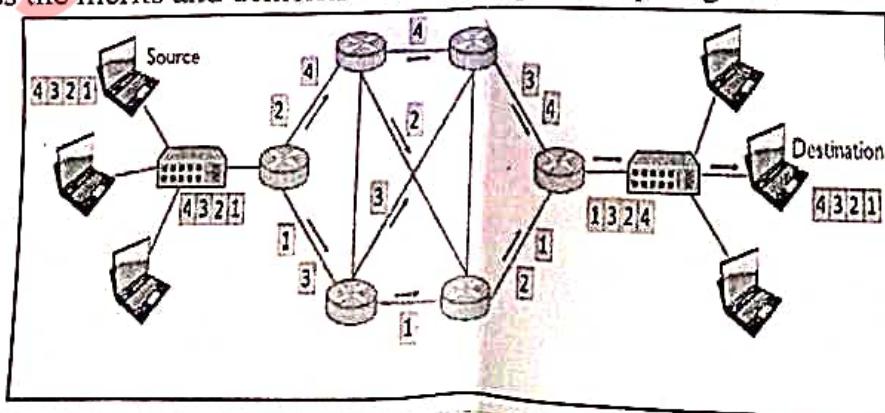
- c. Marks]

2. a. Assume that you are working as a Network Administrator in XYZ Pvt Ltd. Your Manager has asked you to setup a laboratory with capacity of 60 machines. Elaborate all types of LAN topologies and suggest a suitable LAN topology with justification. [7 Marks]

- b. A networking device is designed in such a way that, it forwards the packet out of every valid outgoing link. Identify the networking device and highlight the drawbacks while the network is connected with more number of systems. [3 Marks] 10

Identify the switching technique used in the network given below, where data communication takes place. Explore the identified switching technique in detail and also discuss the merits and demerits with the help of delay diagram.

3.

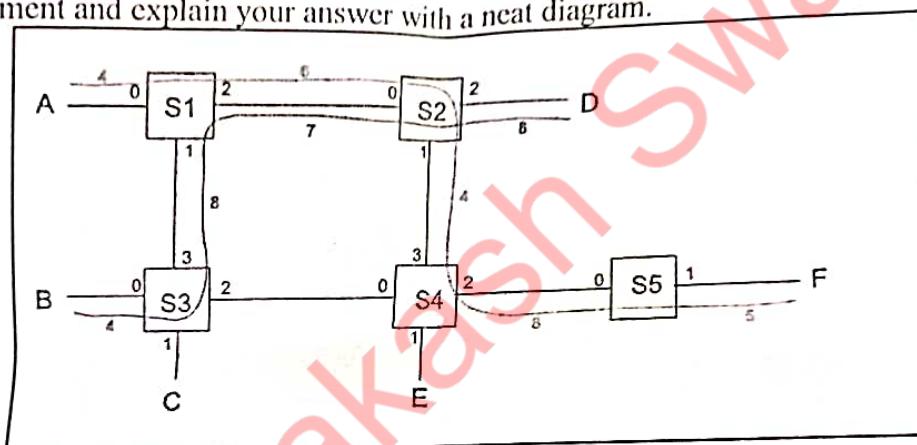


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4.

10

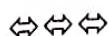
Consider the network below. Switch ports are numbered 0,1,2,3. Two paths are drawn in, one from A to F and one from B to D; each link is labeled with its VCI number AF: 4,6,4,8,5 and BD: 4,8,7,8 respectively. Construct the switching table for these two path establishment and explain your answer with a neat diagram.



5

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- Apply three of the error detection methods except CRC for the given bit sequence 0110011 1101001 1110011 0001100 and discuss the disadvantages of each methods. [Use Even Parity wherever required] [5 Marks]
- Solve the following using Cyclic Redundancy Check (CRC) in both sender side and receiver side. Message (M) = 1010001101. Pattern (P) = 110101. [Use Even Parity wherever required] [5 Marks]



10

A You are a software engineer working on a new communication protocol. You need to send the message "ABACED" to a remote machine. You know that the communication channel is unreliable and that there is a chance of bits being flipped during transmission. You decide to use Hamming code to protect your message from errors. How would you use the Hamming code to decode the message "ABACED"?

B What is the total delay (latency) for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of  $2 \mu\text{s}$  and a processing time of  $1 \mu\text{s}$ ? The length of the link is 2000 Km. The speed of light inside the link is  $2 \times 10^8 \text{ m/s}$ . The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible?

10

A Sender wants to transfer the data over a bandwidth of 5000 HZ. Find the capacity of the channel in the presence of noise and in the absence of noise. Assume relevant values. Also find the channel capacity in the presence of 95% and 5% of the noise.



**Continuous Assessment Test I – September 2023**

Programme :	B.Tech. (CSE)	Semester :	Fall 2023-2024
Course :	Computer Networks	Code :	BCSE308L
Faculty :	Dr. Pradeep Kumar TS, Dr. Subbulakshmi T, Dr. Muthumanikandan V	Slot :	F2+TF2
Time :	90 Minutes	Class Nbr :	CH2023240100688, CH2023240100687, CH2023240101172
		Max. Marks :	50

**Answer ALL the questions**

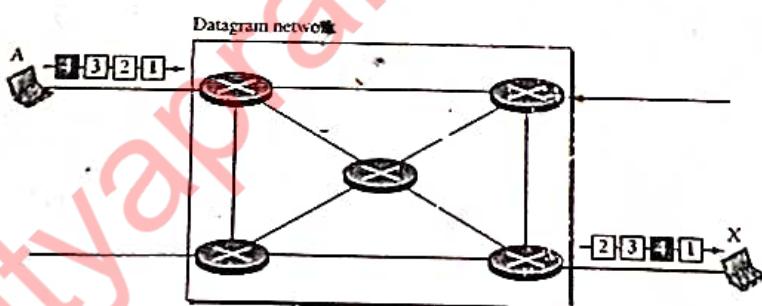
Q. Sub No. Sec	Questions	Mark s
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The following diagram shows a packet switched network where the packets are chunked in to 4 parts and at the receiving end, they were assembled together in a different order. Complete the diagram by making the chunks to pass through the datagram network. (NB: Use your imagination.). Also redraw the diagram for circuit switching and message switching.

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- Find the checksum at the sender site.
- Find the checksum at the receiver site if there is no error.
- Find the checksum at the receiver site if the second data item is changed to OxABCE.
- Find the checksum at the receiver site if the second data item is changed to OxABCE and the third data item is changed to Ox02BA.

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4. What is the total delay (latency) for a frame of size 5 million bits that is being sent on a link with 10 routers each having a queuing time of  $2 \mu s$  and a processing time of  $1 \mu s$ ? The length of the link is 2000 Km. The speed of light inside the link is  $2 \times 10^8$  m/s. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible? 10
- B A Sender wants to transfer the data over a bandwidth of 5000 HZ. Find the capacity of the channel in the presence of noise and in the absence of noise. Assume relevant values. Also find the channel capacity in the presence of 95% and 5% of the noise. 10



Reg. No.:

Name :

21BPS1364

Mobin Chinchwadkar



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

### Continuous Assessment Test I – January 2023

Programme	: B. Tech (CSE and its Specializations)	Semester	: Winter'22-23
Course	: Computer Networks	Code	: BCSE308L
Faculty	: Dr. PRASAD M Dr. AMRIT PAL Prof. SAHAYA BENI PRATHIBA Dr. S A AMUTHA JEEVAKUMARI Prof. NOEL JEYGAR ROBERT V Dr. RENJITH Prof. RAJESH KUMAR	Class Nbr	: G2+TG2
Time	: 90 Minutes	Slot	: CH2022235001301 CH2022235001271 <b>CH2022235001268</b> CH2022235000944 CH2022235001270 CH2022235001302 CH2022235000943
		Max. Marks	: 50

**Answer ALL the questions**

Q.No.	Sub. Sec.	Questions	Marks
1.		<p>(i) There are 20 nodes in a fully connected mesh of an academic lab. Find the maximum number of links and ports required for each node and the total number of links used in the network. [4 marks]</p> <p>(ii) For the academic lab network, choose and justify the best topology method considering the network's future growth, cable length, and other vital parameters as a cost-effective solution. [6 marks]</p>	10

As a Network Engineer, provide solutions for the following scenarios with a detailed explanation:

- |    |  |    |
|----|--|----|
| 2. | <p>(i) Your company is experiencing slow network speeds and frequent connection drops on its network. Using the OSI model, explain the steps you would take to troubleshoot and resolve the issue. [2 Marks]</p> <p>(ii) Your company is implementing a new security protocol to encrypt all network communications. Using the OSI model, explain the steps involved in implementing the new protocol and how it will affect each layer of the OSI model. [2 Marks]</p> <p>(iii) Your company is planning to upgrade its network infrastructure to support the latest technologies and protocols. Using the OSI model, explain how the upgrade will affect each layer of the OSI model and the benefits it will bring to the network. [2 Marks]</p> <p>(iv) Your company is planning to integrate a new application that requires real-time communication and low latency. Using the OSI model, explain how the application will interact with the network and what modifications, if any, need to be made to the network to support the new application. [2 Marks]</p> <p>(v) Your company has multiple branches and they are using different networking equipment and protocols. Using the OSI model, explain the steps you would take</p> | 10 |
|----|--|----|

to integrate these different networks and ensure seamless communication between all branches. [2 marks]

3. (i) Suggest a switching method that is low in error rate to connect four offices of GHY Corporation at Mumbai North, Mumbai South, Mumbai East, and Goa. [6 Marks]

(ii) Will you recommend switched virtual circuit or permanent virtual circuit for these connections? Justify. [4 Marks] 10

4. (i) Calculate the bandwidth which can be achieved using a bit duration of 8 microseconds. Based on this bandwidth, calculate the time taken to transfer 100MB of data from the sender to the receiver. Consider the distance between the sender and receiver as 1000 km and the speed of the signal as  $2 \times 10^8$ m/sec. [4 Marks] 10

(ii) Find out the type of networks used at your school or place of work. Also, describe the network types, topologies, and switching methods used there with a neat diagram. [6 Marks]

5. VITCC is planning to integrate a new application that requires real-time communication and low latency. Using the TCP/IP model, explain how the application will interact with the network and what modifications, if any, need to be made to the network to support the new application. 10





## Continuous Assessment Test (CAT) – I - FEB 2024

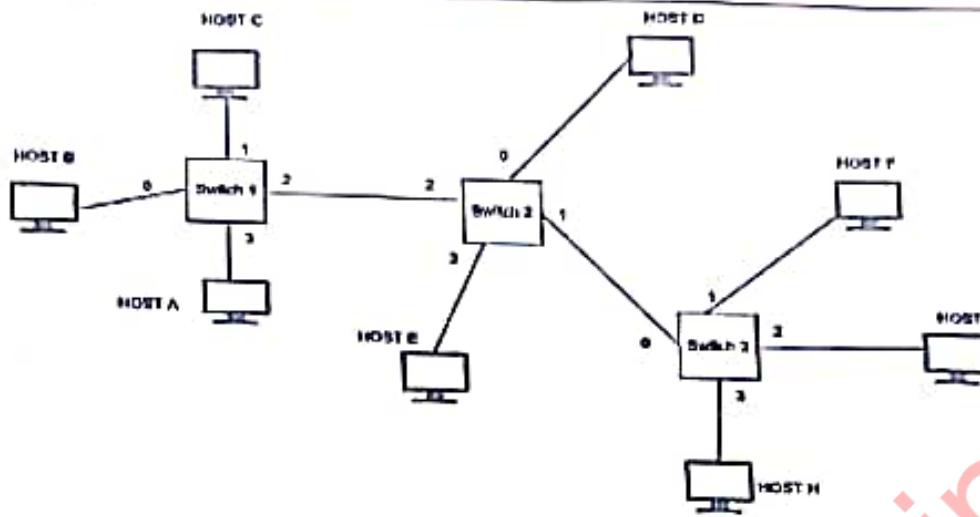
Programme	:	B. Tech (CSE)	Semester	:	Winter 2023-24
Course Code & Course Title	:	BCSE3081 - Computer Networks	Class Number	:	CII2023240501837 CII2023240501845 CII2023240501839 CII2023240501848
Faculty	:	Dr. Kanchana Devi V, Dr. Karmel A, Dr. Anusha K, Dr. Padmavathy T V	Slot	:	D1+TD1
Duration	:	90 Minutes	Max. Mark	:	50

**General Instructions:**

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted

**Answer all questions**

Q. No.	Sub Sec.	Description	Marks
1.		Application X on computer A sends a message to application Y on computer B. Computers A and B are connected to LAN1 and LAN2, and both LANs are connected to Router R1. Explain the data processing that is performed in every layer of computer and router with respect to the OSI reference model. Use a diagram to explain your answer.	(10)
2.		Assume that you are working as a Network Administrator in XYZ Pvt Ltd. Your Manager has asked you to setup a laboratory with capacity of 60 machines. Elaborate all types of LAN topologies and suggest a suitable LAN topology with justification.	(10)
3.		<p>Assume a scenario where XYZ Corporation has multiple offices and branches worldwide, and the corporate network is crucial for communication and data exchange between various departments. To enhance network efficiency and reduce communication costs, XYZ Corporation plans to implement packet switching. Detail the process of creating virtual circuit tables for all the switches after each of the following connections is established, considering the cumulative sequence of connections. Assume that the Virtual Circuit Identifier (VCI) assignment always selects the lowest unused VCI on each link, starting with 0.</p> <p>Provide the virtual circuit tables for the following connections:</p> <p>(a) Host C connects to Host H.  (b) Host B connects to Host G.  (c) Host F connects to Host A.  (d) Host E connects to Host F.  (e) Host D connects to Host G.</p>	(10)



4.	a. A frame 1101011011 is transmitted using CRC method. The generator polynomial is $X^4+X+1$ . Show the actual bit string transmitted. Suppose the third bit from the left of codeword is inverted during transmission. Show that this error is detected at receivers side. [10 Marks] b. Write a short note on importance of padding in CRC. [2 Marks]	(12)
5.	A Satellite TV channel has a bandwidth of 1MHz. With necessary formula, calculate the appropriate bit rate if, (a) The signal to noise ratio of the channel is 63. (b) The signal to noise ratio of the channel is 0.	(8)

\*\*\*\*\* All the best \*\*\*\*\*



**VIT**

Vellore Institute of Technology  
Approved by University under section 2(f) UGC Act, 1956  
CHENNAI

Reg. Number:

72BCE1351

### Continuous Assessment Test (CAT) – I - FEB 2024

Programme	:	B. Tech (CSE)	Semester	:	Winter 2023-24
Course Code & Course Title	:	BCSE308L - Computer Networks	Class Number	:	CH2023240501838 CH2023240501847 CH2023240501840 CH2023240503359
Faculty	:	Dr. Kanchana Devi V , Dr. Karmel A, Dr. Anusha K, Prof. Priyanka Mishra	Slot	:	D2+TD2
Duration	:	90 Minutes	Max. Mark	:	50

#### General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted

Answer all questions

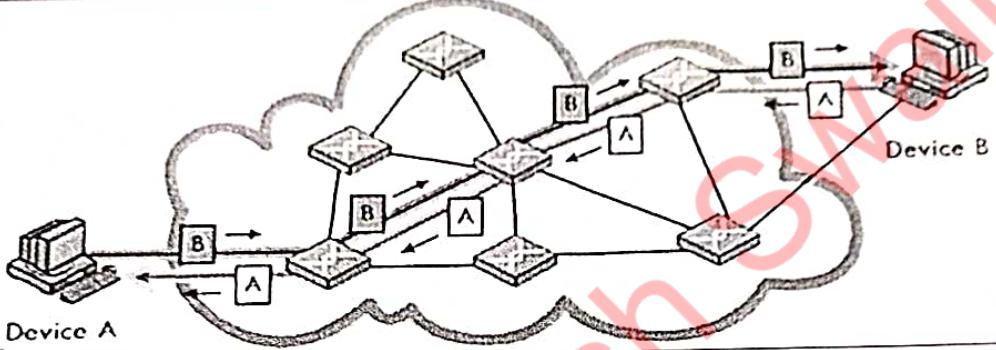
Q. No	Sub Sec.	Description	Marks
1.		<p>Given the OSI protocol layers to perform the following, <u>identify and explain</u> their function in detail.</p> <p>i. Determine which route through the subnet to use. <i>routing - network</i>  ii. Dividing the transmitted bit stream into frames. <i>→ datalink (Segment)</i>  iii. Encryption and compression of the information. <i>(Presentation)</i>  iv. Flow control between source and destination node <i>datalink + transport</i>  v. Maintain synchronization among the source and destination. <i>Session</i></p>	(10)
2.		Draw and discuss the various topologies used for network communication. For each topology, discuss the consequences if a connection fails.	(10)
3.		Compare circuit-switching and packet-switching networks based on the following criteria: <ul style="list-style-type: none"> <li>Reserving network resources ahead of data being sent</li> <li>Utilizing network resources efficiently</li> <li>Guaranteeing uniform network quality of service during the connection</li> <li>Delay Diagram</li> <li>Note on blocking and non-blocking network</li> </ul>	(10)
4.	a.	<p>Consider the network diagram which uses a switching technique to optimize the use of the channel capacity available in digital telecommunication networks, such as computer networks, and minimize the transmission latency. Identify and describe the switching technique employed for the communication in the diagram. [5 Marks]</p> <p>Does a predefined path require for this switching technique? If yes, give reason. [5 Marks]</p>	(10)

Yes L → C → data P

P → data  
↓ V.C →

C / D

B-1



5. a. Consider a user is downloading 1MB audio file as a 32 bit sequence from a FTP server as 10011001011101100001010100001001. Calculate and Discuss the steps involved in checksum calculation by assuming each segment is of 8 bits. [6 Marks]
- b. List and discuss in detail various causes which induce error to the transmitted data. Which layer is responsible to perform error detection? [ 4 Marks]

\*\*\*\*\* All the best \*\*\*\*\*

(10)

→ Att  
→ Noise

# Let's Connect.....!! 😊



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[VIT-C 27 \(Satya Helpzz\) Group 2](#)

[MasterLink 🌐 \(Everything i do\)](#)



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