VIT
Vellore Institute of Technology
CHENNAI

Reg. Number:	23BAI1038

Continuous Assessment Test (CAT) – I - AUG 2024

Programme	:	**B. Tech (CSE) and its Specialization**	Semester	:	**Fall 24-25**
Course Code & Course Title	:	**BCSE308L – Computer Networks**	Class Number	:	CH2024250100836 CH2024250100841 CH2024250100930 CH2024250100934 CH2024250101458
Faculty	:	**Prof. NEELANARAYANAN V** **Prof. PUNITHA K** **Prof. SHYAMALA L** **Prof. MENAKA PUSHPA A** **Prof. PRIYANKA MISHRA**	Slot	:	**F1+TF1**
Duration	:	1½ Hours	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		i. Is the Internet a packet switching or circuit switching network? Justify your answer. [3 Marks] ii. If your answer for (a) was "packet switching", provide an example of a network that uses circuit switching technology; if your answer for (a) was "circuit switching", provide an example of a packet-switching network. In both cases, justify your answer. [3 Marks] iii. Suppose you were recruited to take part in the group who is designing the Future Internet. To do that, you and your colleagues are considering that the main applications driving the Internet of the Future will be real-time services such as audio and video streaming, distributed games, etc. Would you propose a design based on packet switching or circuit switching? Justify your answer. [4 Marks]	10
2		Important goals of the DARPA Internet protocols are to support multiple types of communication services and to accommodate a variety of networks. List and explain in detail the types of networks used in today's Internet also discuss the any 2 communication services available in application layer.	10
3		The following questions deal with CRC error detecting code. i. Given a message M = 1010001101, determine the CRC using the polynomial $P = x^5 + x^4 + x^2 + 1$. Show your work. [7 Mark] ii. What is the transmitted message T? [1 Mark]	10

		How does the receiver check whether the message T was transmitted without any errors? [2 marks]	
4		Suppose you are using a PC at home, which is connected to the Internet using a modem over a telephone communication link. The modem can transfer data at a maximum rate of 28,800 bits/sec. i. How long would it take to download a file (which is 1000000 bytes long) from a server your PC is connected to? [4 marks] ii. Suppose that the answer to (a) is X seconds and you transferred the same sized files numerous times. You find that the actual time to transfer always takes longer than X seconds. Give a valid explanation for the above case. [6 Marks]	10
5		Suppose that we want to design a reliable data transfer protocol that only uses negative acknowledgments. The sender operates in a selective repeat fashion with a large window size, and only retransmits a packet when it receives a NAK from the receiver. The channel may lose or corrupt messages and the delays are variable and unknown. i. Would sequence numbers be necessary in this protocol? Why? [2 Marks] ii. Would a timer be necessary or advisable in this protocol? Why? If so, would it be preferable to have the timer at the sender, receiver or both. Illustrate with a diagram [6 Marks] iii. List the advantages of a NAK-based protocol. [2 Marks]	10

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

Course Code & Course Title	:	**BCSE308L – Computer Networks**	Class Number	:	CH2024250100932 CH2024250100936 CH2024250100938 CH2024250100539 CH2024250101460 CH2024250101463 CH2024250100861
Faculty	:	**Prof. NEELANARAYANAN V** **Prof. PUNITHA K** **Prof. KARMEL A** **Prof. SHYAMALA L** **Prof. MENAKA PUSHPA A** **Prof. SWAMINATHAN A** **Prof. SUDHA A** **Prof. DHANALAKSHMI R** **Prof. DEEPA NIVETHIKA** **Prof. KABILAN K**	Slot	:	**F2+TF2**
Duration	:	1½ Hours	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.		A company has 10 computers that need to be connected using any one of the network topologies, except hybrid topology. The company is considering the following metrics: (i) cost of cabling, and (ii) network reliability. The cost of cabling per meter is Rs.50 and the cost of RJ45 Connector is Rs.5 per piece. The average distance between any two computers is 10 meters. Based on the above scenario answer the following questions by considering the different possible network topologies: a) Calculate the total number of cables required in each topology. [5 Marks] b) Calculate the total number of RJ45 Connectors required in each topology. [4 Marks] c) Based on the above calculations, which topology should the company choose if their primary concern is (i) cost, (ii) reliability, and (iii) network performance? Justify your	15

		answer. [6 Marks]	
2.		Assume that translation, encryption and compression are some of responsibilities of the layer in the OSI model. According to you, explain which layer is responsible for these responsibilities in TCP/IP model? Explain your answer precisely.	5
3.		A professor performed a wireless site survey at VIT Chennai campus auditorium hall to determine the number of access points required and their proper placements so that the professor would have the necessary radio frequency coverage. After ten days, the professor delivered a lecture with massive crowd in the same auditorium. During this lecture, the signal strength and quality of the wireless area network were not desirable. i. In your opinion, find out the reasons for the deficient performance. [3 Marks] ii. List and explain all the performance parameters caused this deficiency in communication. [7 Marks]	10
		Assume that host A wants to send 4 frames (of 10 bytes each). The timeout values at hosts A and B are 2 * RTT. Suppose that the 2nd frame is lost whereas all the following frames and all acknowledgments are delivered without error. The hosts can use Go-Back-N (GBN) and Selective Repeat (SR). i. Draw the complete data transmission sequences for the above scenario using both the techniques. [8 Marks] ii. As an expert, suggest better mechanism for a greater number of data transmission. Justify your choice. [2 Marks]	10
		i. Explain how the CRC-32 algorithm generates a CRC code for a given data frame. Provide a step-by-step description of the process, including how the generator polynomial is used. Then, describe how the receiver uses the CRC to detect errors in received data. [3 Marks] ii. If the data frame is 1101011011 and the generator polynomial is 10011, calculate the CRC code for this data frame and demonstrate the process involved in both the sender and receiver side.[7 Marks]	10

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