



# VIT<sup>®</sup>

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

Slot : B1 + TB1

## School of Computer Science Engineering and Information Systems

Fall Semester 2024-2025

### Continuous Assessment Test – I

Programme Name & Branch : B.Tech -IT

Course Name & code: COMPUTER NETWORKS / BITE305L

Class Number (s): VL2024250103369, VL2024250103353, VL2024250103361

Faculty Name (s) : Dr.C Navaneethan , Dr.Vani M.P, Dr. Rahamathunnisa.U

Exam Duration: 90 Min.

Maximum Marks: 50

| Q.No. | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Max Marks |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1.    | Mr. Sam and Mr. Ram are communicating over a network. Each message exchanged between them is processed and wrapped before being transmitted. Suggest two models that are used to wrap the data? Show the similarities and dissimilarities between the two models. (10 Marks)                                                                                                                                                                                      | 10        |
| 2.    | <p>Suppose there are 80 devices connected together in the network below.</p> <p>i. Determine the type of topology used by each network. ( 2 Marks)<br/>ii. Identify the total number of I/O ports required per device in each network. ( 2 Marks)<br/>iii. Calculate how many dedicated links are required to connect to each network. ( 3 Marks)<br/>iv. For each of the above networks, discuss the consequences of a connection (link) failure. ( 3 Marks)</p> | 10        |
| 3.    | Alice wants to talk with Bob over telephone. When he places a call, the switching equipment within the telephone system seeks out a physical path all the way from Alice telephone to the Bob's telephone. Brief about the switching technique used in the above scenario and highlight the disadvantages of the same.                                                                                                                                            | 10        |

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| 4. | <p>i. The power of a signal is 20 mW and the power of the noise is 2 <math>\mu</math>W; what are the values of SNR and SNR<sub>dB</sub>? ( 3 marks)</p> <p>ii. A signal travels through an amplifier, and its power is increased 20 times. Calculate the amplification (gain of power). ( 2 marks)</p> <p>iii. Compute the theoretical highest bit rate at which information can be transferred. The bandwidth of a communication channel is 3000 Hz and the SNR is 30 decibel. ( 5 marks)</p>       | 10 |
| 5. | <p>Design a three-stage space-division switch with <math>N = 578</math>. Use 9 crossbars at the first and third stages and 4 crossbars at the middle stage.</p> <p>a. Draw the configuration diagram. ( 2 Marks)</p> <p>b. Calculate the total number of crosspoints. ( 4 Marks)</p> <p>c. Find the possible number of simultaneous connections. ( 2 Marks)</p> <p>d. Find the possible number of simultaneous connections if we use a single crossbar (<math>578 \times 578</math>). ( 2 Marks)</p> | 10 |