Roll No. CS22B1030	Name: K. Balan Sai Manutha.

Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram
Mid Sem Examination, October 2024

Course Code:CS3001
Batch: CSE and CSE AI
DOE:3rd OCT 2024
Part A:

Course Title: Computer Networks
Marks:30
Duration: 90 Min
Part B :

Total : 19.5 ~~20~~/30

Instruction to Students:

- **Attach this question paper on top of answer sheet.**
- **Make necessary assumption wherever needed, but highlight the same in your answer.**
- **Do not write sub-questions within a question at different place.**
- **No step marking is awarded for the answer.**
- **Answer written with pencil is not considered**

Part A **Marks:20**

1. Explain the types of transmission modes. 3M
2. What makes a network effective and efficient? 3M
3. Why layering is used in the computer network. What are the advantages and disadvantages of the layered concept? 3M
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 microsecond and a processing time of 1 microsecond. The length of the link is 2000 Km. The speed of light inside the link is 2 x 108 m/s. The link has a bandwidth of 5 Mbps. Which component of the total delay is dominant? Which one is negligible. 3M
5. Draw the data stream 0011001110111101 with graph of following schemes. 3M

   a)NRZ (b) NRZ-I (c) NRZ-L (d) RZ (e) Different Manchester (f) Manchester encoding

6. We need a three-stage space division switch N=100. We use 10 crossbars at the first and third stages and 4 crossbars at the middle. 3M
   a. Draw the configuration diageam
   b. Find the possible number of simultaneous connections.
   c. Find the possible number of simultaneous connections.
7. N number of stations want to transmit the data through the shared medium. How the stations will identify the shared medium is free or busy? Explain in detail? 2M

Part B

Marks:10

1. a. Consider a system generating 20 bit frames and connected through a shared 20kbps channel. Find throughput in percent if slotted ALOHA is used and frame rate is 1000 fps. 5M
   b. Provide a brief explanation for the following questions

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a. Under light load, which LAN has smaller delay: Ethernet or Token Ring?
b. Under heavy load, which LAN has smaller delay: Ethernet or Token Ring?

2 A sender uses the Stop-and-Wait ARQ protocol for reliable transmission of frames. Frames are of size 1000 bytes and the transmission rate at the sender is 80 Kbps (1Kbps = 1000 bits/second). Size of an acknowledgement is 100 bytes and the transmission rate at the receiver is 8 Kbps. The one-way propagation delay is 100 milliseconds. Assuming no frame is lost, the sender throughput is _____ bytes/second. 5M