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Mid-Semester Examination, June-2023
Masters of Computer Applications (Semester II)
MCAC 202: Data Communications and Computer Networks
Year of admission: 2022

Time: One Hour

Max. Marks: 20

1. Which network topology is best suited for a: 4 marks
- small office with limited devices and a need for centralized control and easy troubleshooting?
 - a large university campus with numerous buildings, departments, and a high demand for scalability and fault tolerance?

Justify your answer in each scenario with the help of suitable diagrams.

2. For each of the following line-coding schemes, show the time domain plots for the data stream 4 marks
1101101110, assuming that the last signal level has been positive.
- Differential Manchester
 - NRZ-I (If there is no change, the bit is 0)
 - NRZ-L (the voltage level for 0 is positive and the voltage level for 1 is negative)
 - Pseudoternary
3. a. We have a channel with 4 KHz bandwidth. If we want to send data at 20 Kbps, what will be the SNR? 1 mark
- b. Given the dataword 101001111 and the divisor 10111, use Cyclic Redundancy Check (CRC) to generate the codeword at the sender site. Use modulo-2 arithmetic. 3 marks
4. a. The attenuation of a signal is -10 dB. What will be the final signal power if it was originally 5 watts? 1 mark
- b. Describe the process of Pulse Code Modulation (PCM). 3 marks
5. a. A device is sending out data at the rate of 1000 bps. How long does it take to send a file of 100,000 characters? 1 mark
- b. Consider the network address 198.125.50.0/26. What is the 2nd subnet range? What is the subnet broadcast address for the 4th subnet? 3 marks