School of Computing Science and Engineering
Master of Computer Applications
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem II - E1PY206T - Data Communication and Networking

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Define the concept of a "Metropolitan Area Network (MAN)" and provide two examples of situations where deploying a MAN would be beneficial. K2 (2)

2) Explain the importance of bandwidth in a data communication network. Describe how bandwidth influences the data transmission speed and the overall performance of the network. K1 (3)

3) Explain how redundancy, fault tolerance, and error detection mechanisms enhance network reliability. Provide real-world examples of situations where reliable network performance is critical. K2 (4)

4) A communication channel has a bandwidth of 10 MHz. Calculate the maximum data transfer rate (throughput) using Shannon's Channel Capacity formula if the signal-to-noise ratio is 20 dB. K2 (6)

5) Examine the primary uses and benefits of computer networks in contemporary society. Highlight at least three specific areas where computer networks play a crucial role, explaining how they enhance communication, collaboration, and resource sharing. Provide real-world examples to support your arguments. K3 (6)

6) Explore the concept of quantization in analog-to-digital conversion. Define quantization and discuss its role in representing continuous analog signals with discrete digital values. K3 (9)

7) Provide a detailed analysis of the Mesh Topology in computer networks. Discuss the characteristics, advantages, and challenges associated with implementing a mesh network. Compare mesh topology with other common topologies, such as star and bus, and explain scenarios where a mesh network is preferred. Illustrate with diagrams to highlight the connections in a mesh topology. K4 (8)

8) Examine the significance of sampling in the analog-to-digital conversion process. Explain the Nyquist theorem and its role in determining the minimum sampling rate required to accurately represent an analog signal in digital form. K4 (12)

OR

Analyze the principles and applications of microwaves in unguided transmission media. Explain how microwaves are generated and their characteristics for communication purposes. Evaluate the advantages and challenges associated with using microwaves in point-to-point communication links and satellite communication systems. K4 (12)