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Bengaluru

Mid Term Examinations - October 2026

Date: 06/10/2026 **Time:** 11:45 AM - 01:15 PM

Course Code: CSE2251 **Course Name:** Data Communication and Computer Networks

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	92	88

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Explain why optical fiber is preferred for long-distance and high-speed data communication.	2	CO1	BT2
2	Compare LAN and WAN based on geographical coverage and applications.	2	CO1	BT2
3	Describe four functions of the Physical Layer in the OSI model.	2	CO1	BT2
4	Explain how CRC helps in detecting errors during data transmission.	2	CO2	BT2
5	Determine the maximum bit rate for a noiseless channel having a bandwidth of 2 kHz and using 4 signal levels.	2	CO2	BT3

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Mention different types of network topologies? Describe each type in detail, including their advantages and disadvantages.	10	CO1	BT2
7	Explain the difference between analog and digital signals. Discuss the advantages and disadvantages of each type of signal in data communication.	10	CO1	BT2

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Explain the OSI reference model with a neat diagram. Describe the functions of all seven layers and illustrate how each layer contributes to network communication.	10	CO1	BT2
9	Explain the concept of Spread Spectrum in communication. Discuss its significance and the two main types of Spread Spectrum techniques—Frequency Hopping and Direct Sequence.	10	CO1	BT2

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

10	Solve the following problem using the Parity Check Code: Given the 5-bit data stream 10101, perform the following: 1. Determine the parity bit using even parity and odd parity. 2. For each of the following received data streams, perform the appropriate parity check and determine whether the data has been transmitted correctly: Received Data (Even Parity): 101010 Received Data (Odd Parity): 101011 If an error is detected, identify the position of the erroneous bit.	10	CO2	BT3
11	Solve the following problem using the Cyclic Redundancy Check (CRC) technique: Given the data bit stream 1011011101 and the generator polynomial $x^3 + x + 1$: 1. Convert the generator polynomial into its binary representation. 2. Perform the CRC division step by step and calculate the CRC bits. 3. Construct the transmitted frame by appending the CRC bits to the original data. 4. Given the received frame 1011011101001, perform the CRC division and determine whether an error has occurred. 5. State the conclusion based on the remainder obtained.	10	CO2	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	Explain the concept of channelization in communication systems. Discuss the key differences between FDMA, TDMA, and CDMA. Provide examples of each technique, along with their advantages and limitations.	10	CO2	BT2
13	Explain the concept of Data Link Layer protocols in computer networks. Discuss the different types of Data Link Layer protocols that are used over noiseless channels.	10	CO2	BT2