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**PRESIDENCY  
UNIVERSITY**

**BENGALURU**

**School of Computer Science and Engineering**

**Mid - Term Examinations -November 2024**

**Semester:** III

**Date:** 07/11/2024

**Course Code:** CSE3155

**Time:** 02.00pm to 03.30pm

**Course Name:** Data Communications and Computer Networks

**Max Marks:** 50

**Program:** B.Tech CSE and Allied

**Weightage:** 25%

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**Instructions:**

*(i) Read all questions carefully and answer accordingly.*

*(ii) Do not write anything on the question paper other than roll number.*

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**Part A**

**Answer ALL the Questions. Each question carries 2marks.**

**5Qx2M=10M**

- |          |   |                |           |            |
|----------|---|----------------|-----------|------------|
| <b>1</b> | Define network topology and list two common types of topology?        | <b>2 Marks</b> | <b>L1</b> | <b>C01</b> |
| <b>2</b> | List two responsibilities of the physical layer in the OSI model.     | <b>2 Marks</b> | <b>L1</b> | <b>C01</b> |
| <b>3</b> | Define flow control and recall its significance in data transmission. | <b>2 Marks</b> | <b>L1</b> | <b>C01</b> |
| <b>4</b> | Illustrate two sub-layers of the Data Link Layer and their functions. | <b>2 Marks</b> | <b>L2</b> | <b>C02</b> |
| <b>5</b> | List the protocols of data link layer used for noisy channels.        | <b>2 Marks</b> | <b>L2</b> | <b>C02</b> |

**Part B**

**Answer ALL Questions. Each question carries 10 marks.**

**4QX10M=40M**

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|----------|--|----------------|-----------|------------|
| <b>6</b> | <b>a.</b> Identify the OSI model layers with diagram and list their functions. | <b>5 Marks</b> | <b>L3</b> | <b>C01</b> |
|          | <b>b.</b> List the four fundamental characteristics of data communications.    | <b>3 Marks</b> | <b>L1</b> | <b>C01</b> |

- c. Explain the role of each component in the communication process. **2 Marks** **L2** **C01**

**Or**

- 7 a. Identify the TCP/IP model layers with diagram and list their functions. **5 Marks** **L3** **C01**
- b. What is the definition of bandwidth, and what is its unit? **2 Marks** **L1** **C01**
- c. Explain the difference between simplex, half-duplex, and full-duplex modes of data flow in computer networks, and provide an example of each. **3 Marks** **L2** **C01**

- 8 a. State the Various Types of Unguided Media in Wireless Communication. **3 Marks** **L1** **C01**
- b. Define the basic structure of an optical fiber. **2 Marks** **L1** **C01**
- c. The power of a signal is 20 mW and the power of the noise is 2  $\mu$ W. Compute the values of SNR and SNR<sub>dB</sub>. **5 Marks** **L3** **C01**

**Or**

- 9 a. State the Various Types of guided Media in wired Communication. **2 Marks** **L1** **C01**
- b. Define spread spectrum and explain its importance in communication systems. Classify the types of spread spectrum techniques. **3 Marks** **L1** **C01**
- c. Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with four signal levels. Compute the maximum bit rate? **5 Marks** **L3** **C01**

- 10 a. Define minimum Hamming distance with an example. **2 Marks** **L1** **C02**
- b. Explain the CSMA/CA process with a flowchart, detailing the steps involved in channel sensing, collision avoidance, and data transmission in a wireless network. **5 Marks** **L2** **C02**
- c. Illustrate the basic working principle of TDMA. **3 Marks** **L2** **C02**

**Or**

- 11 a. How does a controlled access protocol work? Explain one **3 marks** **L1** **C02**

type of controlled access protocol.

- b.** Explain the need for CSMA (Carrier Sense Multiple Access) in network communication and describe the three CSMA persistent methods. What are the advantages and disadvantages of each method? **5 Marks** **L2** **CO2**
- c.** Interpret the basic working principle of stop and wait protocol. **2 Marks** **L2** **CO2**

**12** A bit stream 10110011 is transmitted using the CRC method with the generator polynomial  $x^4+x+1$ . **10 Marks** **L3** **CO2**

1. Compute the codeword to be transmitted.
2. If the third bit from the left changes during transmission, explain how the receiver can identify this error.

**Or**

**13** Compute and predict, if there are any transmission errors in the received data using CRC. **10 Marks** **L3** **CO2**

i) A receiver receives the data sequence 100111001. The generator polynomial used is  $x^3+x^2+1$ .

ii) A receiver receives the data sequence 100100001. The generator polynomial used is  $x^3+x^2+1$ .