Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 13 – 12- 2025 **Time:** 09:30am – 12:30pm

School: SOCSE	**Program:** B Tech	
Course Code : CSE2251	**Course Name:** Data Communication and Computer Networks	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**26**	**24**	**26**	**24**	

Instructions:

(i) Read all questions carefully and answer accordingly.

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

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Define data communication and list its fundamental characteristics.	**2 Marks**	**L1**	**CO1**
2.	List the advantages and disadvantages of star topology	**2 Marks**	**L1**	**CO1**
3.	The power of a signal is 10mW and the power of the noise is 1μW; Calculate the values of SNR and SNRdB?	**2 Marks**	**L3**	**CO1**
4.	Define the functions of data link layer.	**2 Marks**	**L1**	**CO2**
5.	Differentiate between Simple and Stop & Wait protocol.	**2 Marks**	**L2**	**CO2**
6.	Convert the following IPv4 addresses from dotted-decimal notation to binary notation. 221.34.7.82	**2 Marks**	**L2**	**CO3**
7.	Convert the following IPv4 addresses from binary notation to dotted-decimal notation. 10101100 . 00010000 . 00000000 . 00000001	**2 Marks**	**L2**	**CO3**
8.	Define the function of the Header Checksum field in IPv4?	**2 Marks**	**L1**	**CO3**

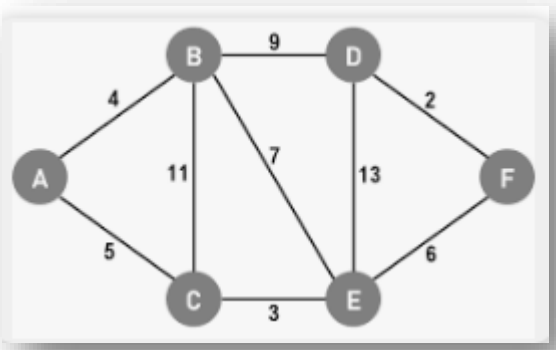
9.	Define the sliding window protocol?	**2 Marks**	**L1**	**CO4**
10.	Describe the purpose of UDP in the Transport Layer?	**2 Marks**	**L1**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	You are assigned the task of setting up a communication network for a small organization. The network will use the TCP/IP Model as its communication framework. Identify and briefly describe the layers of the TCP/IP Model, highlighting the key functions of each layer in ensuring effective communication within a network.	**15 Marks**	**L2**	**CO1**
	b.	Explain with the use of formulae the Nyquist Theorm and Shannon Capacity theorm in detail.	**5 Marks**	**L3**	**CO1**
		Or			
12.	**a.**	Explain the Transmission media and Describe in brief the categories of the Transmission media. Assume that we need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. Calculate how many signal levels do we need?	**15 Marks**	**L2**	**CO1**
	b.	Assume that we have a channel with a 1-MHz bandwidth. The SNR for this channel is 63. Calculate the appropriate bit rate and signal level?	**5 Marks**	**L3**	**CO1**

13.	**a.**	Explain the CSMA/CA mechanism with its three strategies with flow diagram.	**10 Marks**	**L2**	**CO2**
	b.	Describe the working of Pure ALOHA and Slotted ALOHA with flow diagrams.	**10 Marks**	**L2**	**CO2**
		Or			
14.	**a.**	A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x3+1. 1. State the actual bit string transmitted? 2. Suppose the third bit from the left is inverted during transmission. How will receiver detect this error	**10 Marks**	**L2**	**CO2**
	b.	Describe the concept of Multiple Access with Channelization in communication networks. Explain the different techniques of channelization used for efficient multiple access in a shared communication medium	**10 Marks**	**L2**	**CO2**

15.	**a.**	Given the following network graph, apply the Link State Routing Protocol to determine the shortest path from Node A to all other nodes in the network. Explain the steps involved in building the Link State Routes and calculating the shortest paths using Dijkstra's algorithm.  	**12 Marks**	**L2**	**CO3**
	b.	Explain Class full addressing in detail with example for each.	**8 Marks**	**L2**	**CO3**
Or					
16.	**a.**	Explain the rules for creating CIDR Block. Given the CIDR representation 30.20.30.35 / 27. Identify the range of IP Addresses in the CIDR block.	**10 Marks**	**L2**	**CO3**
	b.	Explain Distance Vector Algorithm with detailed example.	**10 Marks**	**L2**	**CO3**

17.	**a.**	Illustrate and explain the format of a User Datagram Protocol (UDP) packet. Given the following binary data, calculate the checksum for the UDP packet and explain how the receiver will verify the checksum: i. 0011000000110001 (data 1) ii. 0000000001010000 (data 2) **iii.** 0000000000001000 (data 3)	**10 Marks**	**L3**	**CO4**
	b.	Describe HTTP and distinguish between persistent and non-persistent connections.	**10 Marks**	**L2**	**CO4**
Or					
18.	**a.**	Describe the concept of Selective Repeat ARQ and explain its role in achieving reliable data communication. Provide an example to illustrate how Selective Repeat ARQ manages errors and ensures the correct delivery of packets during transmission	**10 Marks**	**L2**	**CO4**
	b.	Illustrate SMTP and HTTP Protocol in detail.	**10 Marks**	**L3**	**CO4**