CLASS: I.MSc   **SEMESTER: VIII**
BRANCH: Mathematics   **SESSION: SP22**
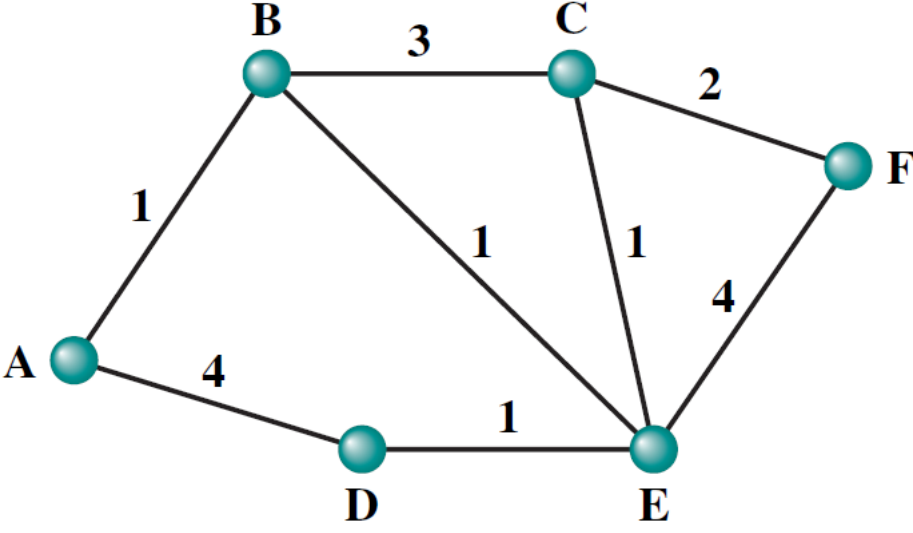   **SUBJECT: CA559 DATA COMMUNICATION & COMPUTER NETWORKS**
TIME: 2 Hrs.   **FULL MARKS: 50**

INSTRUCTIONS:
1. **The question paper contains five (5) questions of total fifty (50) marks.**
2. **Attempt all questions.**
3. **The missing data, if any, may be assumed suitably.**
4. **Before attempting the question paper, be sure that you have got the correct question paper.**

1.	Choose the correct option (s). Each question carries 2 marks	**[10]**
	a. In linear block codes, which operation can be applied on two valid codewords to create another codeword.	
	i. OR	
	ii. XOR	
	iii. AND	
	iv. None of the above	
	b. In C (11, 7) coding scheme, number of unused codewords will be:	
	i. 2048	
	ii. 1920	
	iii. 1900	
	iv. 128	
	c. One goal in data communications is to increase the _____, while decreasing the _____.	
	i. signal rate, data rate	
	ii. data rate, r	
	iii. data rate, signal rate	
	iv. signal rate, r	
	d. -6 in one's complement arithmetic using only 8 bits will be represented as	
	i. 9	
	ii. 249	
	iii. -9	
	iv. -14	
	e. Average bandwidth requirement is satisfied by which of the following line coding schemes:	
	i. Bipolar AMI	
	ii. Multilevel 2B1Q	
	iii. Polar NRZ	
	iv. Polar biphase	
2.	Short answer questions of 2 marks each	**[10]**
	a. Explain the relationship between Hamming distance and error.	
	b. Encode the pattern of bits " 1 0 1 0 0 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0 0 " in HDB3. Show the digital signal representation of the encoded bits as well.	
	c. In Go-Back-N ARQ, currently S_f = frame 0, S_n = frame 7, in a sliding window with m=4. Frames 0,1,2,3 are acknowledged. Show the send window before sliding and after sliding.	
	d. Describe the technique used to improve the efficiency of bidirectional protocols to carry data frames and control information.	
	e. The signal rate for Manchester and differential Manchester is double that for NRZ. Give reason with the help of an example.	

3.	Short answer questions of 3 marks each	[15]
	a. What data will be received under the following scenario:	
	• Sent data : AX	
	• Burst error of length 9 bits with atleast 3 bits in error. Assume the remaining data.	
	b. Why do we need standardization within protocol architecture? Explain any one layer of OSI model.	
	c. Explain any one guided transmission media.	
	OR	
	Explain any one unguided transmission media.	
	d. Encode digital data 01001100011 using	
	i. NRZ-L	
	ii. Bipolar AMI	
	e. Explain Frame Relay	
	OR	
	Explain ATM	
4.	a. What is the purpose of switching? Discuss packet switching **OR** circuit switching?	[5+5]
	b. A bit stream 10011101 is transmitted using the CRC method. The generator polynomial is x^3+1. What is the actual bit string transmitted? Suppose the fourth bit from the left is inverted during transmission. How will receiver detect this error?	
5.	Generate a least-cost-route to all other nodes for node B	[5]

either using Dijkstra algorithm **OR** Bellman-Ford algorithm