Q.6		Attempt any two:							
	i.	Explain cycle redundancy check. Assume that data is 110101010 and the code generator is 10101. Calculate CRC codeword.	**5**	3	5	1,2 3	1,4		
	ii.	What is hamming distance? If the 7-bit Hamming codeword received by a receiver is 1011011. Assuming the even parity, state whether the received codeword is correct or wrong. If wrong, locate the bit in error.	**5**	3	5	1,2 3	1,4		
	iii.	Explain sliding window error control mechanism in data communication with suitable examples.	**5**	3	5	1,2 3	1,4		

******

Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering / Science
End Sem Examination Dec 2024
CS3CO28 / BC3CO39 Data Communication

Programme: B.Tech./ B.Sc. Branch/Specialisation: CSE All/ Computer Science

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**BL**	**CO**	**PO**	**PSO**
Q.1	i.	Which of the following is required for communication between two computers? (a) Communication hardware (b) Communications software (c) Protocol (d) All of these including access to transmission medium	**1**	1	1	1,2 3	1,4
	ii.	Which of the following is the fastest media of data transfer? (a) Fiber optic (b) Co-axial cable (c) Untwisted wire (d) Telephone lines	**1**	1	1	1,2 3	1,4
	iii.	Which modulation scheme is preferred for frequency hopping spread spectrum process? (a) FSK (b) BPSK (c) MFSK (d) MPSK	**1**	1	2	1,2 3	1,4
	iv.	An analog signal has a bit rate of 8000 bps and a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements we do need? (a) 4 bits/baud; 256 (b) 8 bits/baud; 128 (c) 8 bits/baud; 256 (d) 4 bits/baud; 128	**1**	2	2	1,2 3	1,4
	v.	The Asymmetric Digital subscriber Line – lite uses carriers for (a) 64 DMT (b) 128 DMT (c) 512 DMT (d) 256 DMT	**1**	1	3	1,2 3	1,4

vi.	Subscriber telephones in the PSTN are connected through local loops to- (a) End offices (b) Toll offices (c) Primary offices (d) Regional offices	**1**	1	3	1,2 3	1,4		
vii.	Which of the following is an advantage of a peer to peer network? (a) Files and folders cannot be centrally backed up (b) Does not need an expensive server as individual workstations are used to access files (c) The server is expensive to purchase (d) Network security can be carried out centrally	**1**	1	4	1,2 3	1,4		
viii.	The size of an IP address in IPv6 is- (a) 32 bits (b) 64 bits (c) 128 bits (d) 256 bits	**1**	1	4	1,2 3	1,4		
ix.	In the stop-and-wait method of flow control, if 100 good data frames are sent and received. How many ACK frames have been sent by the receiver? (a) 99 (b) 100 (c) 101 (d) 200	**1**	1	5	1,2 3	1,4		
x.	Which error detection method uses 1's complement arithmetic? (a) Simple parity check (b) Two-dimensional parity check (c) CRC (d) Checksum	**1**	1	5	1,2 3	1,4		
Q.2 i.	We have a channel with a 1-MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate and signal level?	**2**	3	1	1,2 3	1,4		
ii.	Define transmission impairments. Explain different causes of transmission impairment during a signal transmission.	**3**	2	1	1,2 3	1,4		

iii.	Name different types of guided media used in transmission of data. Explain any two with their advantages and disadvantages.	**5**	1	1	1,2 3	1,4		
OR iv.	Distinguish the following: (a) Half duplex and full duplex (b) Analog and digital signal (c) Baseband and broadband transmission (d) Serial and parallel transmission (e) Synchronous and asynchronous transmission	**5**	1	1	1,2 3	1,4		
Q.3 i.	Block coding with example. Represent the sequence "01001110" using NRZ-L, NRZ-I, Manchester and AMI schemes.	**3**	2	2	1,2 3	1,4		
ii.	Explain three step procedure of pulse code modulation for analog to digital conversion with example.	**7**	2	2	1,2 3	1,4		
OR iii.	Explain synchronous time division multiplexing with data rate management strategies. Differentiate statistical TDM and synchronous TDM with suitable examples.	**7**	2	2	1,2 3	1,4		
Q.4 i.	Classify different network topologies with their silent features, advantages and disadvantages.	**3**	2	3	1,2 3	1,4		
ii.	What is circuit switching? Enumerate the characteristics of circuit switching. Analyse the three stages of circuit switching.	**7**	2	3	1,2 3	1,4		
OR iii.	Compare and contrast datagram and virtual-circuit packet switched network with delay diagram.	**7**	2	3	1,2 3	1,4		
Q.5 i.	Explain different levels of addressing employed in TCP/IP protocol.	**4**	2	4	1,2 3	1,4		
ii.	Explain the responsibilities of physical layer, data link layer and transport layer of OSI reference model.	**6**	1	4	1,2 3	1,4		
OR iii.	With neat diagram, explain TCP/IP protocol suite of computer networks.	**6**	2	4	1,2 3	1,4		

Marking Scheme

CS3CO28 Data Communication

Q.1	i)	(d) All of above including access to transmission medium	**1**
	ii)	(a) Fiber optic	**1**
	iii)	(c) MFSK	**1**
	iv)	(c) 8 bits/baud; 256	**1**
	v)	(b) 256 DMT	**1**
	vi)	(a) end offices	**1**
	vii)	(b) Does not need an expensive server as individual workstations are used to access files	**1**
	viii)	(c) 128 bits	**1**
	ix)	(b) 100	**1**
	x)	(d) Checksum	**1**

Q.2	i.	Upper bit rate = 6 Mbps	1 mark	**2**
		Appropriate bit rate = 4 Mbps for better performance		
		No. of signal level, L = 4	1 mark	
	ii.	Transmission Impairments	1 mark	**3**
		Causes	2 marks	
	iii.	Name of Guided media	1 mark	**5**
		Two types description	4 marks	
OR	iv.	Half Duplex and Full Duplex	1 mark	**5**
		Analog and Digital Signal	1 mark	
		Baseband and Broadband transmission	1 mark	
		Serial and Parallel transmission	1 mark	
		Synchronous and Asynchronous transmission	1 mark	

Q.3	i.	Block coding	1 mark	**1**
		Representation of sequence 01001110 (0.5 mark*4)	2 marks	**2**
	ii.	Sampling	2 marks	**2**
		Quantization	3 marks	**3**
		Encoding	2 marks	**2**
OR	iii.	Synchronous TDM	3 marks	**3**
		Data rate management strategies	2 marks	**2**
		Differentiation statistical TDM and synchronous TDM	2 marks	**2**

Q.4	i.	Classification	1 mark	**3**
		Description(at least Mesh, Bus, Star, Ring) (0.5 mark*4)	2 marks	
	ii.	Circuit Switching	1 mark	**7**
		Characteristics	3 marks	
		Stages	3 marks	
OR	iii.	Comparison	5 marks	**7**
		Delay diagram	2 marks	

Q.5	i.	Physical addressing	1 mark	**4**
		Logical addressing	1 mark	
		Port addressing	1 mark	
		Specific addressing	1 mark	
	ii.	Physical layer responsibilities	2 marks	**6**
		Data link layer responsibilities	2 marks	
		Transport layer responsibilities	2 marks	
OR	iii.	TCP/IP Protocol Suite architecture	2 marks	**6**
		TCP/IP Description	4 marks	

Q.6

	i.	Cycle Redundancy Check	2 marks	**5**
		CRC codeword = 1101010101011	3 marks	
	ii.	Hamming distance	1 mark	**5**
		Numerical steps	3 marks	
		Error detection and correction: Incorrect bit = bit 5	1 mark	
		Correct codeword = 1001011		
	iii.	Sliding Window protocol Diagram	2 marks	**5**
		Sliding Window protocol Description	3 marks	

******

P.T.O.