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22MCA14

First Semester MCA Degree Examination, Jan./Feb. 2023
Computer Networks

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Briefly explain the five components of Data Communication System with an example each.	05	L2	CO1
	b.	Discuss the functionalities of Physical, Data link and Network layers of OSI reference model with suitable diagrams.	10	L2	CO1
	c.	Explain the different types of addresses used in TCP/IP.	05	L2	CO1
		OR			
Q.2	a.	Discuss the importance of Transport, Session and Presentation layers in OSI model.	10	L2	CO1
	b.	Explain TCP/IP protocol suite with a neat labeled diagram. Describe the transport layer protocols such and TCP and UDP.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the characteristics of Analog and Digital signals.	06	L2	CO2
	b.	Discuss the causes for transmission impairment in computer networks.	08	L2	CO2
	c.	Compare the differences between Nyquist and Shannon's Theorem. A Transmission channel with 1-MHz bandwidth and the SNR for this channel is 63. Find the appropriate bit rate and signal level.	06	L3	CO2
		OR			
Q.4	a.	Discuss the different phase of PCM in detail with a suitable example.	10	L2	CO2
	b.	Sketch the digital signal line coding for the given bit stream 01010000111101011 for Biphase and Bipolar encoding schemes. Analyse the characteristics of each output signal to select the best one.	10	L3	CO2
		Module – 3			
Q.5	a.	Explain the process of multiplexing and demultiplexing with a neat labeled diagram.	06	L2	CO3
	b.	Define Virtual Circuit Identifier. Perform request and acknowledgement setup in virtual circuits with a neat sketch.	06	L3	CO3
	c.	Explain Frequency Hopping Spread Spectrum. Illustrate with an example.	08	L3	CO3
		OR			
Q.6	a.	Make out the differences between Synchronous TDM and Statistical TDM.	06	L4	CO2
	b.	List out the Data Rate Management Techniques used in multiplexing, explain briefly. State the reason for synchronization during multiplexing.	08	L2	CO3
	c.	Mention the advantages and disadvantages of Circuit Switched Networks over Datagram Networks.	06	L2	CO3

Module – 4

Q.7	a.	Explain the procedure employed for error detection and error correction in Block coding.	06	L2	CO4
	b.	Calculate the CRC for the given bit stream 1101011011 with given generator polynomial $G(x) = x^4 + x + 1$. (i) Verify the message at receiver side if bit stream remains. (ii) Inspect the error, if the third bit from the left is being inverted during the transmission.	10	L4	CO4
	c.	Recall the different types of errors occurred during data transmission in networks.	04	L1	CO4

OR

Q.8	a.	Discuss the design of the encoder and decoder of Hamming code generation. Explain the two dimensional parity check value.	10	L5	CO4
	b.	(i) Write the steps involved in Internet Checksum algorithm on both sender and receiver side. (ii) Evaluate checksum value of 1 0 0 1 0 0 1 1 1 0 0 1 0 0 1 1 and 1 0 0 1 1 0 0 0 0 1 0 0 1 1 0 1 considering 16-bit data segment.	10	L5	CO4

Module – 5

Q.9	a.	Differentiate between fixed and variable size framing. Explain character stuffing and bit stuffing process. Apply bit stuffing for the following data bit sequence. 1 0 1 0 0 1 1 1 1 1 0 0 0 0 0 0 1 1 1 1 1 1 0 0	10	L3	CO4
	b.	Discuss the design of stop and wait protocol for noiseless channel. Write an algorithm for the same on the sender and receiver side.	10	L3	CO4

OR

Q.10	a.	Give the taxonomy of protocols of Flow and Error control. Briefly explain Go-Back-N ARQ protocol with an example.	10	L3	CO4
	b.	Explain the frame formats of HDLC and PPP protocols in detail.	10	L3	CO4

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