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RV COLLEGE OF ENGINEERING®
(An Autonomous Institution affiliated to VTU)
VSemester B. E. Fast TrackExaminationsJuly-19
Computer Science and Engineering
COMPUTER COMMUNICATION AND NETWORKS

Time: 03 Hours   *Maximum Marks: 100*
Instructions to candidates:
1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B.In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

PART A

1	1.1	A color image uses 16bits to represent a pixel. What is the maximum number of different colors that can be represented?	01
	1.2	List the connection oriented services with their meaning.	01
	1.3	_____ layer is the network dialog controller.	01
	1.4	The period of a signal is 100ms. What is its frequency in KiloHertz?	01
	1.5	A line has a signal to noise ratio of 1000 and a bandwidth of 4000KHz. What is the maximum data rate supported by this channel?	01
	1.6	What is the result of scrambling the sequence 1110000000000 using the following technique? Assume that the last non-zero signal level has been +ve. i. B8ZS ii. HDB3(the number of non zero pulses is odd after last substitution]	02
	1.7	An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second,find the bit rate.	01
	1.8	One super group is formed using how many voice channels in Analog hierarchy?	01
	1.9	If we use FHSS with a channel bandwidth of $B = 4kHz$ and $B_{ss} = 100kHz$,compute the minimum number of bits in a PN sequence .	01
	1.10	Illustrate using examples the difference between multiplexing and multiple access methods.	02
	1.11	_____ random access method is used in wired network and _____ random access, method is used in wireless networks.	01
	1.12	Find the type of propagation method and band used for Radar, Satellite.	01
	1.13	A code scheme has to correct up to 4 errors what will be the minimum hamming distance?	01
	1.14	In Selective Repeat ARQ, if 4 is the number of bits for the sequence number, then find the maximum size of the sender and the receiver window.	01
	1.15	How does VLANs provide extra security for a network?	01
	1.16	Explain with an example the Hidden station problem in wireless LANs.	02
	1.17	List the network layer protocols of TCP/IP with their use.	01

2	a	What does the term network topology refer to? Explain different types of topologies with
		   i. Relevant diagrams
		   ii. Number of full duplex links required.
		   iii. Advantages and disadvantages
			08

	b	The network layer is responsible for the delivery of individual packets from the source host to the destination host. Justify your answer with the help of a suitable example.	08

3	a	Identify the factors affecting the data rate in data communications and also explain the theoretical formulas developed to calculate the data rate.	06
	b	A computer monitor has a resolution of 1200×1000 pixels. Each pixel uses 1024 colors. Compute the time required to send the complete contents of a screen through a channel with a bandwidth of 1Mbps.	06
	c	Draw NRZ-I and Differential Manchester line coding schemes for the bit stream 1001100111. Assume the signal starts out low.	04

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OR

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4	a	Illustrate one of the method for converting analog signal to digital signal with suitable diagrams. Show the conversion technique both at the sender and the receiver site.	06
	b	Compare multilevel and multi transitional schemes and also draw a multi transitional scheme for the bit stream 01011011. Assume the signal starts art zero voltage.	06
	c	A channel has a bandwidth of 1MHz. The SNR for this channel is 63. What are the appropriate bit rate and signal level?	04

5	a	What is the main goal of a multiplexer? Discuss the multiplexing techniques designed for digital signals in detail.	05
	b	Discuss different propagation modes of optical fiber cables with diagram.	05

	c	Given the data word 1010011110 and the divisor 10111.
		   i. Show the generation of the code word at sender site using polynomials.
		   ii. Show the checking of the code word at receiver site assuming there is an error in the second bit of the received code word.
			06

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6	a	Write down the principles through which spread spectrum achieves its goals. We have a digital medium with a data rate of 10Mbps. Compute the number of 64kbps voice channels that can be carried by this medium if we use DSSS with the Barker sequence.	05
	b	Explain the types of Wireless transmissions with their applications.	05

	c	A sender needs to send the four data items $0 \times 3456, 0 \times ABCC, 0 \times 02BC, 0 \times EEEE$.
		Evaluate the following:
		    i. The checksum at the sender site.
		    ii. The checksum at the receiver site if the second data item is changed to $0 \times ABCE$.
			06

7	a	Explain in detail a byte oriented protocol with its frame format.	06
	b	Illustrate different types of persistent methods present in CSMA.	06
	c	Compute the Walsh table W_8 by taking W_1 as -1.	04

8	a	Discuss any two connecting devices in detail with their application and diagram.	06
	b	Minimum frame length of a Ethernet frame is 64 bytes and maximum is 1518 bytes. Justify your answer by showing the frame.	06
	c	Describe the features of 5G mobile networks.	04