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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

V Semester B. E. Fast Track Examinations Oct-2020

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	Consider a packet switched network. TCP/IP protocol is used to transfer a large file. Mention its advantages and disadvantages.	02
	1.2	Mention the layers that perform these tasks: a) Route determination. b) Flow control. c) Providing user services. d) Defining frames.	02
	1.3	The attenuation of a signal is $-10dB$. Calculate the final signal power if it was originally $5W$.	02
	1.4	List any two line coding techniques.	02
	1.5	Mention the signal components that are shown on horizontal axis and vertical axis in the constellation diagram.	02
	1.6	Determine number of bits per baud if the signal constellation has 16 points.	01
	1.7	Define carrier signal. Explain its role in analog transmission.	01
	1.8	Define baseline wandering and its effect on digital transmission.	01
	1.9	Distinguish between baseband and broadband transmission.	02
	1.10	Define piggy backing and its benefits.	01
	1.11	If it is required to detect two bit errors what should be the minimum hamming distance?	01
	1.12	List different spread spectrum techniques.	02
	1.13	List the strategies used in $CSMA/CA$ to avoid collisions.	01

PART-B

2	a	Describe the components involved in data communications with suitable diagram.	05
	b	With a neat diagram explain encapsulation and decapsulation in TCP/IP model.	06
	c	Explain various types of addresses wit relevant syntax and examples	05
3	a	State and explain the formulae for computation of channel capacities for noiseless and noisy channels.	04

	b	With a baseband channel of $1MHz$ bandwidth, determine the data rate if the following line coding schemes are used: i) $NRZ-L$ ii) Manchester iii) $MLT-3$ iv) $2BIQ$.	06
	c	Define Latency. Compute the latency for a frame of size 5 million bits that is being sent on a link with 10 routers each having time of $2\mu s$ and a processing time of $1\mu s$. The length of the link is $2000Km$. The speed of light inside the link is $2 \times 10^8\ m/s$. The link has a bandwidth of $5Mbps$. Which component of the latency is dominant? Which one is negligible?	06
		OR	
4	a	Define constellation diagram, explain its role in analog transmission. Draw constellation diagram for the following: i) ASK, with peak amplitude values of 1 and 3 ii) $BPSK$, with peak amplitude value of 2 iii) $QPSK$, with peak amplitude value of 3 iv) $8-QAM$ with two different peak amplitude values, 1 and 3, and four different phases.	08
	b	Discuss various transmission impairments.	04
	c	Distinguish between block coding and scrambling.	04
5	a	Show the contents of the five output frames for a synchronous TDM multiplexer that combines four sources sending the following characters. Note that the characters are sent in the same order that they are typed, the third source is silent. i) Source 1 message: $HELLO$ ii) Source 2 message: HI iii) Source 3 message: iv) Source 4 message: BYE	04
	b	With necessary diagrams explain the transmission in guided and unguided medium.	08
	c	Given generator polynomial $P = 110011$ and Message $M = 11100011$ find the Cyclic Redundancy Check using binary division.	04
		OR	
6	a	Differentiate between Pulse Code Modulation and Delta Modulation	04
	b	A IP header is sent from source to destination contains these fields: $4500\ 003c\ 1c46\ 4000\ 4006\ 0000\ ac10\ 0a63\ ac10\ 0a0c$. Determine the checksum at the sender. Assuming the packet is received error free at the destination, prove the same with checksum computation at the destination	04
	c	Suppose we want to transmit the message 1011001001001011 and protect it from the errors using the $CRC8$ polynomial $x8 + x2 + x1 + 1$. i) Use polynomial long division to determine the message that should be transmitted. ii) Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver that an error has occurred?	08

7	a	Describe persistence methods in $CSMA$ with flow diagram.	06
	b	Compare and contrast byte-oriented and bit-oriented protocols.	04
	c	Discuss $HDLC$ protocol with different frame format and control fields.	06
8	a	Explain these connecting devices: i) Hub ii) Link layer switch iii) Router.	06
	b	Demonstrate hidden and exposed station problem in wireless network with necessary figures and examples.	06
	c	Compare and contrast $4G$ and $5G$ network technologies.	04