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Reg No.:_____   Name:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017
Course Code: IT203
Course Name: DATA COMMUNICATION (IT)

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Max. Marks: 100   Duration: 3 Hours

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PART A
Answer any two full questions, each carries 15 marks.

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<div align="right">Marks</div>

1	a)	Encode the pattern 11011001010 using Pseudo-ternary encoding technique.	(3)
	b)	With the help of a neat sketch, discuss the different components of a data communication system.	(4)
	c)	Calculate the latency for a frame of size 100 million bits that is being sent on a link with 10 routers each having a queuing time of 3 microseconds and a processing time of 2 microseconds. The length of the link is 5000 km. The speed of light inside the link is 2×10^8 m/s. The link has a bandwidth of 8 Mbps. Also, identify the dominant component of latency.	(8)
2	a)	Distinguish between baseband transmission and broadband transmission.	(4)
	b)	With the help of an example discuss the Multiline transmission (MLT-3) encoding technique.	(4)
	c)	Explain the various transmission impairments that can occur in a data communication system.	(7)
3	a)	Discuss the characteristics of terrestrial microwave communication.	(4)
	b)	Explain the three types of serial transmission.	(5)
	c)	Encode the pattern 01001101101 using NRZ-L, NRZ-I and RZ schemes.	(6)

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PART B
Answer any two full questions, each carries 15 marks.

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4	a)	Obtain a (3,2) linear block code for the input vector 0 0 0 1 1 0 1 1 using the generator matrix G = $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$	(7)
	b)	With the help of an example, explain Code Division Multiple Access. Also show how the sequences are generated and its properties.	(8)
5	a)	Generate the dictionary for the string 101011011010101011 using Lempel-Ziv algorithm.	(7)
	b)	Distinguish between synchronous and asynchronous TDM. With necessary figures, explain the various strategies used for data rate management.	(8)
6	a)	20 digital sources, each of 100 Kbps, need to be multiplexed using synchronous TDM. Each output slot carries 2 bits from each source, but one extra bit is added to each frame for synchronization. Determine the size of an output frame in bits, output frame rate, duration of an output frame and the output data rate.	(7)
	b)	Generate the Huffman code and calculate the efficiency for a discrete	(8)

memoryless service with seven possible symbols x_i, i=1,2,….,7 and the corresponding probabilities $P(x_1)$=0.46, $P(x_2)$=0.30, $P(x_3)$=0.12, $P(x_4)$=0.06, $P(x_5)$=0.03, $P(x_6)$=0.02 $P(x_7)$=0.01

PART C
Answer any two full questions, each carries 20 marks.

7	a)	Compare WiFi and WiMax.	(5)
	b)	Explain how communication occurs in a circuit-switched network.	(7)
	c)	Given the data word 1111101 and the divisor 1101, using CRC show the generation of codeword at the sender site and the checking of the codeword at the receiver site assuming no error. Now assume that the fourth bit from the right of the codeword is corrupted, show the detection of the error at the receiver site.	(8)
8	a)	List the properties of a linear code.	(4)
	b)	Explain the working of CRC encoder and decoder.	(6)
	c)	Discuss the two approaches to packet switched networks.	(10)
9	a)	Differentiate between single-bit error and burst error. Give examples.	(4)
	b)	What is GSM? Discuss the services provided by GSM.	(6)
	c)	Generate the Hamming code for the data word 1101. Assume that the receiver receives the codeword 0001000. Can the error be detected? Give reasons for your answer.	(10)

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