Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third semester B.Tech degree examinations (S) September 2020

Course Code: IT203
Course Name: DATA COMMUNICATION

Max. Marks: 100   Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.   Marks

1	a)	State and explain Shannon's capacity theorem for noisy channel. Assume that SNR(dB) is 36 and the channel bandwidth is 2 MHz. Calculate the theoretical channel capacity.	(5)
	b)	Distinguish between periodic and aperiodic signals in data communication.	(4)
	c)	Describe different transmission modes in data communication with examples.	(6)
2	a)	Show the equivalent analog sine-wave pattern of the bit string 10110 using amplitude shift keying, frequency shift keying and phase shift keying	(3)
	b)	Summarize the physical description and transmission characteristics of any one guided transmission media.	(6)
	c)	Explain the various modes for propagating light along optical channels.	(6)
3	a)	Define the terms signal element and data element with suitable examples.	(2)
	b)	A nonperiodic composite signal contains frequencies from 10 KHz to 30 KHz. The peak amplitude is 5V for the lowest and the highest signals and is 30V for the 20 KHz signal. Assuming that the amplitudes change gradually from the minimum to maximum, draw the frequency spectrum.	(5)
	c)	Explain polar and bipolar line coding schemes in digital-digital conversion technique with suitable examples.	(8)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Compare and contrast Pulse Code Modulation and Delta Modulation	(10)
	b)	The probabilities of three symbols A, B and C are P(A) = 0.333, P(B)= 0.333, and P(C)= 0.333. Obtain the encoded form of the message "BCCB" using Arithmetic coding.	(5)
5.	a)	What is Synchronous Time Division Multiplexing? Twelve channels are	(7)

multiplexed using TDM. If each channel sends 100 bytes/sec and we multiplex 1 byte per channel determine the frame rate and bit rate of the link.

b) Generate the dictionary for the string 0011 0110 0011 0101 0100 1001 0011 0100 0001 0100 1011 0010 110 using Lempel-Ziv (Zip coding) algorithm. (8)

6 a) Write short notes on WDM and DWDM. (5)

b) Illustrate the construction of Huffman tree with an example. (5)

c) Explain two dimensional parity check code. Illustrate the type of error undetected by the two-dimensional parity check code. (5)

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

7 a) Find the Hamming distance for the following code words and determine the minimum Hamming distance. (4)

    i.   d(1111,1111)

    ii.   d(10101,10010)

    iii. d(1000,0000)

b) Explain the encoding and decoding process of CRC (Cyclic Redundancy Check) with example. (8)

c) Compare and contrast about the efficiency and delay of circuit switching and packet switching. (8)

8 a) Differentiate between single bit error and burst error with examples. (3)

b) With a neat sketch explain the architecture of GPRS. (7)

c) Consider the following generator matrix over GF(3) (10)

$$\begin{bmatrix} 1 & 0 & 1 & 2 & 0 \\ 1 & 2 & 0 & 0 & 1 \\ 0 & 1 & 2 & 1 & 0 \end{bmatrix}$$

Generate all possible codewords using this matrix.

Find the parity check matrix H. What is the minimum distance of this code?

How many errors can this code detect and correct?

9 a) Write short notes on WiMax. (5)

b) Write short notes on RS codes. (5)

c) Identify the difficulties associated with wireless communication. (3)

d) Explain the salient features of GSM. (7)

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