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Pages:3



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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B. TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: CS307

Course Name: DATA COMMUNICATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- 1 Given a receiver with an effective noise temperature of 294k and a 10 MHz bandwidth. Find out the thermal noise level at the receiver's output in dBW? (3)
- 2 Define frequency, phase and wavelength of a signal (3)
- 3 What are the advantages of optical fiber cable compared to twisted pair cable? (3)
- 4 Explain the reflective property of a parabolic antenna? (3)

PART B

Answer any two full questions, each carries 9 marks.

- 5 a) If the spectrum of a channel is between 3MHz and 4 MHz and $SNR_{dB} = 24$ dB. (5)
Then calculate the Shannon Channel capacity? Also find out the number of levels required to achieve the above capacity, by using Nyquist's formula?
b) Compare multimode step index fiber and multimode graded index fiber. (4)
- 6 a) Explain analog and digital data transmission. (4)
b) Describe briefly ground wave propagation. (5)
- 7 a) Explain the different types of noise that affect the performance of a (4)
communication system?
b) Give the physical description of satellite microwave communication system. (5)
Mention some applications.

PART C

Answer all questions, each carries 3 marks.

- 8 Encode the bit pattern 01001100011 using Differential Manchester encoding (3)
technique.
- 9 Define Sampling Theorem. (3)
- 10 What is byte interleaving technique in Time Division Multiplexing (3)

- 11 Draw the STS-1 frame format of SONET. (3)

PART D

Answer any two full questions, each carries 9 marks.

- 12 a) The carrier frequency and difference frequency of an MFSK signal are 250 kHz and 25 KHz. Given that the number of different signal elements (M) is 8 (L= 3 bits). Find out the different frequency assignments for each of the eight possible 3 bit data combinations. (5)
- b) Justify that the frequency spectrum of input signal will move to high frequency bands by FDM process. (4)
- 13 a) Explain any one analog data to analog signal encoding method with neat waveform. (4)
- b) In a CDMA process two users are having the codes as given below. (5)
 User1: 1,1,1,1
 User2: 1,-1,-1,1
 Explain the data transmission process if user1 wants to transmit a bit 0 and user2 wants to transmit a bit 1.
- 14 a) Describe the two main distortions that can be occurred in a Delta modulated waveform. How can it be avoided? (4)
- b) Differentiate statistical TDM and Synchronous TDM using suitable diagrams. (5)

PART E

Answer any four full questions, each carries 10 marks.

- 15 a) Which are the different types of error? (4)
- b) Explain asynchronous and synchronous data transmission modes with frame structures? (6)
- 16 a) Compare packet switching and circuit switching. (4)
- b) Describe the three phases in a circuit switching operation. (6)
- 17 a) In a CRC error detecting scheme, choose divisor polynomial $P: x^4 + x + 1$. Encode the bits 110101011. (7)
- b) What is hamming distance? (3)
- 18 a) Explain the general model of spread spectrum in digital communication system. (5)
- b) How Frequency Hopping Spread Spectrum (FHSS) spreads the baseband signal for transmission? (5)

- 19 a) Generate the CRC code for the data word of 110010101. The divisor is 10101. (5)
b) Explain 2-dimensional parity check with an example. (5)
- 20 a) Explain virtual circuit approach in packet switching. (5)
b) Explain datagram approach in packet switching. (5)