

Reg No.: _____

Name: _____

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. Then calculate the Shannon Channel capacity? Also find out the number of levels required to achieve the above capacity, by using Nyquist's formula? | (5) |
| | 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 communication system? | (4) |
| | b) Give the physical description of satellite microwave communication system. Mention some applications. | (5) |

PART C

Answer all questions, each carries 3 marks.

- | | | |
|----|--|-----|
| 8 | Encode the bit pattern 01001100011 using Differential Manchester encoding technique. | (3) |
| 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)