

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Third Semester B.Tech (minor) Degree Examination December 2020

Course Code: CST285

Course Name: DATA COMMUNICATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions. Each question carries 3 marks

Marks

- | | | |
|----|---|-----|
| 1 | List and explain different factors which determine the performance of communication in a network? | (3) |
| 2 | Express the Time domain and frequency domain representations of a signal with frequencies 0, 8 and 16Hz. | (3) |
| 3 | How the construction of optical fibre helps in reducing the interference? Draw the structure of optical fibre | (3) |
| 4 | For multicast communications which type of wireless transmission waves are suitable? Justify your answer | (3) |
| 5 | Differentiate between NRZL and NRZI encoding techniques with examples | (3) |
| 6 | Show the equivalent analog sine-wave pattern of the bit string 01100101 using amplitude shift keying, frequency shift keying and phase shift keying | (3) |
| 7 | What type of multiplexing is preferred in optical fibre communication? Justify your answer | (3) |
| 8 | Explain the various steps involved in Pulse Code Modulation. | (3) |
| 9 | Assuming even parity, find the parity bit for each of the following data:
i. 1010101 ii. 000000 iii. 10000101 | (3) |
| 10 | What is a major disadvantage of asynchronous transmission? | (3) |

PART B

Answer any one full question from each module. Each question carries 14 marks

Module 1

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|----|---|-----|
| 11 | a) What are the various transmission impairments and explain how they affect performance of a communication link? | (9) |
| | b) Define Channel Capacity. Calculate the appropriate bit rate and signal levels for a channel with 100 Mhz bandwidth and SNR of 255. | (5) |

- 12 a) Briefly discuss different types of noises (8)
- b) How Nyquist theorem applied for a noiseless channel? We need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. How many signal levels do we need? (6)

Module 2

- 13 a) Describe satellite communication (5)
- b) With the help of suitable diagrams, differentiate multi-mode and single-mode optical fibres. How are the rays propagated in step-index and graded-index multi-mode fibres? (9)
- 14 a) What are the three major classes of guided media. Explain (9)
- b) Explain the working principle of parabolic reflective antenna with suitable diagrams. (5)

Module 3

- 15 a) Discuss the methods for digital to analog conversion. We have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What are the carrier frequency and the bit rate if we modulated our data by using ASK with $d = 1$? (10)
- b) Draw the Manchester and Differential Manchester encoding schemes for the data 01001100011. (4)
- 16 a) State Sampling theorem. With help of suitable diagrams, explain the process of transforming analog data in to digital signal using Pulse Code Modulation technique (9)
- b) Describe BFSK and QPSK. Given the bit pattern 101110001. Encode the stream using BFSK and QPSK (5)

Module 4

- 17 a) Explain FDM and TDM with suitable diagrams (10)
- b) A multiplexer combines four 100-kbps channels using a time slot of 2 bits. Show the output with four arbitrary inputs. What is the frame rate? What is the frame duration? What is the bit rate? What is the bit duration? (4)
- 18 a) With suitable example explain the working principle of Code division multiplexing for CDMA technology (5)
- b) Explain the following terms: i) DSSS ii) FHSS (9)

Module 5

- 19 a) Using CRC, given the data word 100100 and the divisor is 1101 (10)
i. Show the generation of the code word at sender site
ii. Show the checking of code word at receiver site
b) Differentiate Synchronous and Asynchronous transmissions (4)
- 20 a) Explain the datagram approach in packet switching. (10)
b) Compare and contrast circuit switching and packet switching techniques (4)
