

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022

(2020 SCHEME)

Course Code : 20CST285

Course Name: Data Communication

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Define frequency, phase and wavelength of a signal with a diagram.
2. Describe simplex, half-duplex and full-duplex transmission modes with suitable examples.
3. What are the advantages of optical fiber cable compared to twisted pair cable?
4. Compare multimode step index fiber and multimode graded index fiber.
5. Discuss differential Manchester encoding scheme with example.
6. What is Amplitude Modulation? Give an example.
7. Explain code division multiplexing.
8. Discuss Wavelength division multiplexing.
9. The data to be transmitted is given below. If it is sent with odd parity, what will be the parity bit generated?
 - a) 11010
 - b) 000000
 - c) 01010000
10. Define different types of errors occur in data transmission with example.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11.
 - a) Describe the different types of transmission impairments. (8)
 - b) Suppose the spectrum of a channel is between 3MHz and 4MHz and SNRdB is 24 dB. What is the capacity of the channel? Based on Nyquist's formula, how many signalling levels are required? (6)

OR

12.
 - a) Calculate the bandwidth, if a periodic signal is decomposed into 4 sine waves with frequencies 50 Hz, 100 Hz, 150 Hz and 200Hz. (6)

Draw the spectrum, assuming all components having amplitude in the range 6-12 V and all are multiple of two in the increasing order.

- b) Distinguish between Nyquist bandwidth and Shannon capacity. Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with (i) Two signal levels and (ii) Four signal levels. Determine the maximum bit rate in both these cases. (8)

MODULE II

13. a) Explain various guided transmission medias? (9)
 b) Explain the working principle of parabolic reflective antenna with suitable diagrams. (5)

OR

14. a) Explain different wireless propagation modes with suitable diagrams. (6)
 b) Give the physical description of satellite microwave communication system. Mention some applications. (8)

MODULE III

15. a) Encode the bit stream 10101100 into the following line coding schemes assuming that the last signal level has been negative: (10)
 i) NRZ-I
 ii) NRZL
 iii) Manchester
 iv) Differential Manchester
 v) Bipolar AMI (Most recent preceding 1 bit has negative voltage)
- b) Differentiate between Advanced Delta Modulation and Delta Modulation. (4)

OR

16. a) State Sampling theorem. Explain Pulse Code Modulation with suitable figures. (8)
 b) Convert the bit stream 101010 in to analog signals by using ASK, Binary FSK and Binary PSK (6)

MODULE IV

17. a) 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? (6)
 b) Discuss (8)
 i) DMA
 ii) DSSS

OR

18. a) With the help of an example, explain the working of Frequency Hopping Spread Spectrum. (8)
- b) Explain the different techniques by which the disparity in input data rate is handled by Time Division Multiplexing. (6)

MODULE V

19. a) Using CRC, given the data word 1010011110 and the divisor 10111 (8)
- i) Show the generation of the codeword at the sender site
- ii) Show the checking of the codeword at the receiver site.
- b) With the help of a suitable example, explain the virtual circuit approach of packet switching. (6)

OR

20. a) What is Circuit switching? Explain the three phases in Circuit switching with suitable diagrams. (6)
- b) Find the Hamming code for the data-word 1011001. Assume odd parity. (8)
