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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CS 307

Course Name: DATA COMMUNICATION

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries3 marks. Marks

1 Describe simplex, half-duplex and full-duplex transmission modes with suitable examples. (3)

2 Identify the significance of Nyquist bandwidth and Shannon capacity formula in determining the performance ofcommunication in a network. (3)

3 Discuss time domain and frequency domain concept of a signal . Draw the frequency domain plot of a periodic signal. (3)

4 How the twisting affects performance in twisted pair cable ? (3)

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PART B

Answer any two full questions, each carries9 marks.

5 a) What are the various transmission impairments and explain how they affect performance of a communication link? (9)

6 a) Define Channel Capacity. Calculate the appropriate bit rate and signal levels for a channel with 100 Mhz bandwidth and SNR of 255. (5)

b) Compare terrestrial and satellite microwave transmission. (4)

7 a) Explain the working principle of parabolic reflective antenna with suitable diagrams. (5)

b) For a parabolic reflective antenna with a diameter of 4 m, operating at 13 GHz, what is the effective area and theantenna gain? (4)

PART C

Answer all questions, each carries3 marks.

8 Name any two line coding schemes which provide self-synchronization. Explain with reasoning. Draw the pattern for any one of such scheme for the following data: 10101111. (3)

9 Explain how Statistical TDM utilizes channel bandwidth better than Synchronous TDM. (3)

10 How interference is avoided in frequency division multiplexing? Explain with suitable figures. (3)

11 Explain SONET/SDH frame format. (3)

PART D

Answer any two full questions, each carries9 marks.

12 a) Encode the bit stream **10101010** into the following line coding schemes assuming that the last signal level has been negative: (6)

i) NRZ-I

ii) NRZL

iii) Manchester

iv) Differential Manchester

v) Bipolar AMI (Most recent preceding 1 bit has negative voltage)

vi) Pseudoternary (Most recent preceding 1 bit has negative voltage)

b) Convert the bit stream 101010 in to analog signals by using ASK, Binary FSK and Binary PSK (3)

13 a) Explain Frequency Division Multiplexing process. (6)

b) Discuss Digital Carrier Systems. (3)

14 a) With neat diagram, explain delta modulation technique. (6)

b) Discuss wave length division multiplexing. (3)

PART E

Answer any four full questions, each carries 10 marks.

15 a) Differentiate Synchronous and Asynchronous transmissions (5)

b) How errors are detected using parity checking? What are the limitations of parity checking? (5)

16 a) Using CRC, given the dataword 1010011110 and the divisor 10111 (10)
i. Show the generation of the codeword at the sender site
ii. Show the checking of the codeword at the receiver site

17 a) An error detection and correction scheme has a minimum Hamming distance, $d_{min}= 6$. (5)

i)How many bit errors can it detect?

ii)How many bit errors can it correct?

b) What is the Hamming distance for each of the following codewords: (4)
a. d (10000, 11000)
b. d (10101, 10010)

c. d (11111,11111)
d. d (000, 100)

18 a) Discuss Frequency hopping spread spectrum technique (10)

19 a) What is Circuit switching? Explain the three phases in Circuit switching with suitable diagrams. (10)

20 a) Compare and contrast Datagram and Virtual-circuit packet switched networks? (5)

b) With the help of a neat block diagram, explain the structure of a packet switch. (5)