

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017**

**Course Code: CS307**

**Course Name: DATA COMMUNICATION (CS)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks.*

- 1 Define simplex, half duplex and full duplex transmission mode. Give one example for each. (3)
  - 2 List and explain different factors which determine the performance of communication in a network? (3)
  - 3 Write physical and transmission characteristics of Optical Fibre Cable guided transmission media. (3)
  - 4 What are the advantages of microwave transmission over radio wave transmission? (3)
- For a parabolic reflective antenna with a diameter of 2m, operating at 12 GHz. Calculate the antenna gain? Given effective area =  $56\pi$ .

**PART B**

*Answer any two full questions, each carries 9 marks.*

- 5 a) (a) Explain time domain and frequency domain concept of a signal in a communication system. (5)
  - b) List various impairments and explain how they affect information carrying capacity of a communication link? (4)
  - 6 a) How does cross talk occurs in twisted pair cables? Give the purpose of CAT5e, CAT6, CAT7 twisted pair cables. (5)
  - b) Show that doubling the distance between transmission antenna and receiving antenna attenuates the power received by 6dB. (4)
  - 7 a) Define Channel Capacity. What key factors affect highest data rate for noiseless channel and noisy channel? (5)
- Signal to Noise Ratio is often given in decibels. Assume  $SNR_{db}=36$  and the channel bandwidth is 2Mhz. Calculate theoretical channel capacity?
- b) Explain following wireless propagation modes (4)
  - (i) Ground wave propagation (ii) Sky wave propagation

**PART C**

*Answer all questions, each carries 3 marks.*

- 8 Give the significance of delta modulation over pulse code modulation during the process of transforming analog data in to digital signal. (3)
- 9 Show the equivalent analog sine-wave pattern of the bit string 00110101 using amplitude shift keying, frequency shift keying and phase shift keying (3)
- 10 What are the advantages of using multiplexing in data communication? How does a synchronised time division multiplexer stay synchronized with de-multiplexer on receiving end? (3)
- 11 What type of multiplexing is preferred in optical fibre communication? Justify your answer (3)

**PART D**

*Answer any two full questions, each carries 9 marks.*

- 12 a) For the bit stream 11000110010, sketch the wave form for each of the code of NRZ-I, NRZ-L, Bipolar-AMI, Pseudoternary, Manchester, Differential Manchester. (5)
- b) Explain the modulation technique used in Asymmetric Digital Subscriber Line (ADSL) and cable modems (4)
- 13 a) With suitable example explain the working principle of Code division multiplexing for CDMA technology. (5)
- b) Explain the frame format of Synchronous Optical Network (SONET) for the version SDH. (4)
- 14 a) State Sampling theorem. With help of suitable diagrams, explain the process of transforming analog data into digital signal using Pulse Code Modulation technique. (5)
- b) How Time division Multiplexing (TDM) handle disparity in the input data rate, if data rate of all input lines are not same? (4)

**PART E**

*Answer any four full questions, each carries 10 marks.*

- 15 a) Explain with suitable diagram, how asynchronous and synchronous connections are used in data communication. (5)
- b) Explain major types of noise occur during data transmission, which causes errors. (5)
- 16 a) Why would you expect a CRC to detect more errors than a parity bit? For P=110011 and M=11100011, Find CRC. (5)
- b) With suitable examples explain sliding window error control mechanism in data communication. (5)
- 17 a) Give any two reasons why baseband signal cannot be directly transmitted in a wireless system? How Frequency Hopping Spread Spectrum (FHSS) spread the baseband signal for transmission. (5)
- b) How does spread spectrum eliminates narrow band interferences? Explain Direct Sequence Spread Spectrum (DSSS) technique. (5)
- 18 a) What are the different architectural components in public communication network? Explain its working principle. (5)
- b) Explain the datagram approach for packet switching network. What is the significance of packet size in packet switching network? (5)
- 19 a) Given the dataword 1001001111 and the divisor 10111, show the generation of the CRC codeword at the sender site using binary division. (5)
- b) Calculate the hamming pairwise distance among following codewords; (5)
- i) 00000, 10101, 01010      ii) 000000, 010101, 101010, 110110
- 20 a) List four major components of packet switch and write their function (5)
- b) With suitable example illustrate working of virtual circuit approach for packet switching (5)

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