Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2022 (2019 Scheme)

Course Code: ITT 305

Course Name: DATA COMMUNICATION AND NETWORKING

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1	Why are routers known as intelligent devices?	(3)
2	List any two specific functions of the following OSI model layers. i. Presentation Layer ii. Application Layer	(3)
3	Encode the pattern 010001011 using the following techniques. i. Manchester ii. Alternative Mark Inverse (AMI) iii. Pseudoternary	(3)
4	Encode the sequence 110000000011000 using B8ZS scrambling technique. Assume that the last non-zero signal level has been positive.	(3)
5	Differentiate between Synchronous and Asynchronous transmission.	(3)
6	One of the challenges in Time-Division Multiplexing is how to handle a disparity in the input data rate. Name the three data rate management strategies related to Time Division Multiplexing.	(3)
7	We need a data word of at least 16 bits. Find the values of k and n in the Hamming code C (n, k) with $d_{min} = 3$.	(3)
8	What are the different persistence methods used with CSMA?	(3)
9	With an example, explain the principle of optimality.	(3)
10	Differentiate between adaptive and non-adaptive routing algorithms.	(3)

PART B

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

Module -1

11	a)	Explain the purpose of cladding in an optical fiber.	(4)
	b)	With a neat sketch, explain OSI reference model in detail.	(10)
12	a)	Write a short note on satellite communication.	(6)
	b)	Explain any two physical transmission media used in computer network. Write the advantages and disadvantages of each.	(8)

Module -2

13	a)	Explain the different types of transmission impairment in data communication systems.	(8)
	b)	Explain any three metrics used to measure network performance.	(6)
14	a)	The available bandwidth of a channel is 100 kHz, which spans from 250 to 350 kHz. Determine the carrier frequency and the bit rate if we modulated our data using the following techniques. (Let d=1) i. Amplitude Shift Keying ii. Frequency Shift Keying	(4)
	b)	With a neat diagram, explain Pulse Code Modulation encoding process.	(10)

Module -3

15	a)	Five channels, each with a 150 kHz bandwidth are to be multiplexed together. Calculate the minimum bandwidth of the link if there is a need for a guard band of 15 kHz between the channels to prevent inferences.	(4)
	b)	Explain Frequency Hopping Spread Spectrum with an example.	(10)
16	a)	Distinguish between synchronous and statistical TDM.	(6)

b) Consider four stations A, B, C, D are communicating using CDMA (Code Division Multiple Access). The code assign to each station is as follows: (8)

A: (+1, +1, +1, +1)

B: (+1, -1, +1, -1)

C: (+1, +1, -1, -1)

D: (+1, -1, -1, +1)

Assume that station A and B are sending 0 bit and station D is sending 1 bit. Station C is silent.

i. Find the resultant channel chip sequence.

ii. Suppose station 3 and 2 are communicating each other. Show that how station 3 can detect the data sent by station 2.

Module -4

17 a) Explain Two-dimensional Parity Check method for error detection with an example. (6)

b) Explain the operation of CSMA/CD with suitable figures. (8)

18 a) Differentiate between slotted ALOHA and pure ALOHA. (4)

b) Outline the structure of encoder and decoder for a Hamming code with an example. (10)

Module -5

19 a) Explain the count to infinity problem with an example. (6)

b) With an example, explain the Distance Vector Routing algorithm. (8)

20 a) Define the term traffic shaping. Explain any one technique to shape traffic. (6)

b) Write short note on the following: (8)

i. Random Early Detection

ii. Network Flooding

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