BTS-III(R/S)-02.22-0023 Reg. No. | | | | | | | | |

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B.Tech. Degree III Semester Regular/Supplementary Examination February 2022

CS 19-202-0306 DATA AND COMPUTER COMMUNICATION

(*2019 Scheme*)

Time: 3 Hours Maximum Marks: 60

PART A

(Answer *ALL* questions)

(8 × 3 = 24)

I. (a) What is the difference between a port address, a logical address, and physical address?

(b) A complex low-pass signal has a bandwidth of 200 kHz. What is the minimum sampling rate for this signal?

(c) Assume that a voice channel occupies a bandwidth of 4 kHz. We need to multiplex 10 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth.

(d) What are the three phases required for communication in a circuit switched network?

(e) Consider a binary code that consists only four valid code words as given below.
00000, 01011, 10101, 11110
Let minimum Hamming distance of code be p and maximum number of erroneous bits that can be corrected by the code be q. Find the value of p and q.

(f) What is meant by data compression? Classify the data compression techniques.

(g) The address 43:7B:6C:DE: 10:00 has been shown as the source address in an Ethernet frame. The receiver has discarded the frame. Why?

(h) Why CSMA/CD protocol cannot be used with IEEE 802.11?

PART B

(4 × 12 = 48)

II. (a) Explain the duties of various layers of the ISO-OSI model. (7)

(b) How does attenuation, distortion and noise impair a signal? (5)

OR

III. (a) Explain the following line coding schemes with an example (10)
(i) NRZ
(ii) NRZ-L
(iii) NRZ-I
(iv) RZ

(b) An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate. (2)

IV. (a) Explain Frequency Hopping Spread Spectrum (FHSS). (6)

(b) Describe the different types of guided transmission media. (6)

OR

V. (a) Describe Discrete Multitone Technique (DMT). (8)

(b) What are the different components of a packet switch? (4)

(P.T.O.)

VI. (a) A message block 01011011 is transmitted across a data link using CRC. The generator polynomial is $x^3 + x + 1$ (8)

(i) Show the generation of codeword at sender site

(ii) Show the checking of codeword at receiver site (assume no error).

(b) What kind of errors cannot be detected by checksum? (4)

OR

VII. (a) Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols. (6)

(i) Stop-and-Wait ARQ

(ii) Go-Back-N ARQ

(iii) Selective-Repeat ARQ

(b) Encode "abababababa" using LZW algorithm. (6)

VIII. With the help of diagrams, explain the various network topologies. (12)

OR

IX. (a) What are the sublayers of Data Link Layer in the case of Ethernet? Explain the functions of these sublayers. (4)

(b) Explain Bluetooth piconet and scatternet. (8)

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