Name of the Examinations: B.E. PRINTING ENGINEERING FOURTH YEAR FIRST SEMESTER EXAMINATION - 2024

Subject Code: PRN/PC/B/CSE/T/414

Subject: DATA COMMUNICATION AND NETWORKING

Time: Three hours | Full Marks: 100

Group – A (Answers all questions)

1 x 10 = 10

1. What is an internet?
2. What is protocol?
3. Which layers of the TCP/IP protocol suite are involved in a link-layer switch?
4. Name one protocol which is used in Transport layer.
5. What layer in the TCP/IP stack is equivalent to the Network layer of the OSI model?
   A. Application
   B. Host-to-Host
   C. Internet
   D. Network Access
6. What is the Hamming distance for each of the following codeword:
   d (11010, 10101)
7. The term FTP stands for _____.
8. In _____ coding, we divide our message into blocks, each of k bits, called _____.
9. Define full-duplex connection mode.
10. What is multicasting?

Group – B (Answers any five questions)

1. a) Define ring topology and assume five devices are arranged in it. How many cables are needed? How many ports are needed for each device?
   b) What are the advantages and disadvantages of a multipoint connection over a point-to-point one?
   c) Why are protocols needed? Identify the five components of a data communication system.
   d) Draw and compare four basic network topologies with each other. 2+2+ (2+2) + 10 = 18

2. a) Match the following to one or more layers of the TCP/IP protocol suite:
   i. Creating user datagrams
   ii. Responsibility for handling frames between adjacent nodes
   iii. Transforming bits to electromagnetic signals
   b) What do you mean by data communication?
   c) What are three major network types? Explain briefly.
   d) Write any two major functions for each of the layer of TCP/IP protocol suite. 3+1+6 + 8 = 18

3. a) Explain working procedure of Fiber-Optic cable?
   b) Define the following terms: i) Composite Signals and bandwidth ii) Period and Frequency iii) Bit rate and Bit Length
   c) Draw the graph of the data stream 11001010 using NRZ-L, RZ, Manchester and Differential Manchester scheme. 2+6+10 = 18

4. a) What are single bit and burst error?
   b) What are the responsibilities of data link layer?
   c) Why simple parity check cannot detect even parity bit error?

d) Explain Parity-Check code C (5, 4) method with suitable block diagram. Also explain the following scenarios, assume dataword is 1010 and codeword is 10100, which is sent to the receiver.

i. One single bit error changes a_2

ii. One single-bit error changes a_3. 2+2+2+ (8+4) =18

5. a) Explain connectionless and connection-oriented protocol.
   b) Compare CSMA/CD and CSMA/CA.
   c) What is access control?
   d) Explain behaviour of different persistence methods in CSMA.

   2+4+2+10=18

6. a) What is sequence number in Go-Back-N ARQ?
   b) Explain send window for Go-Back-N ARQ with a suitable block diagram.
   c) What will happen if time expired in this protocol?
   d) In Go-Back-N ARQ, why the size of the send window is less than 2^m, explain with an example.

   2+4+2+10=18

7. a) Briefly explain client-server network model.
   b) Write advantages and disadvantages of this model.
   c) Explain different termination methods of TCP connection.

   6+6+6= 18