QPC: SN19BTECH1377 AR 19 Reg. No | | | | | | | | | | |

# GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2023

## BPEEC7021 - Data Communications and Networking

(ECE)

Time: 3 hrs Maximum: 70 Marks

**Answer ALL Questions**

**The figures in the right hand margin indicate marks.**

**PART – A: (Multiple Choice Questions)** **(1 x 10 = 10 Marks)**

| Q.1. Answer *ALL* questions | | [CO#] | [PO#] |
|---|---|---|---|
| a. | Demodulation is the process of:<br>(i) Dividing the high-speed signals into frequency bands<br>(ii) Converting digital signals to analog signals<br>(iii) Converting analog signals to digital signals<br>(iv) Combining many low-speed channels into one high speed channel | CO1 | PO1 |
| b. | The protocol that is used to transmit data without any scheduled time is:<br>(i) Random access<br>(ii) Controlled access<br>(iii) Channelization<br>(iv) none of these | CO2 | PO3 |
| c. | In _____, the chance of collision can be reduced if a station senses the medium before trying to use it.<br>(i) CSMA<br>(ii) TDMA<br>(iii) CDMA<br>(iv) FDMA | CO1 | PO2 |
| d. | IANA stands for;<br>(i) Internal Associative Numbers Authority<br>(ii) Internal Assigned Numbers Authority<br>(iii) Internet Associative Numbers Authoritative<br>(iv) Internet Assigned Numbers Authority | CO1 | PO2 |
| e. | What is the hamming distance between the codes '11001011' and '10000111'<br>(i) 2<br>(ii) 3<br>(iii) 4<br>(iv) 5 | CO2 | PO2 |
| f. | In _____, the chance of collision can be reduced if a station senses the medium before trying to use it.<br>(i) CSMA<br>(ii) CDMA<br>(iii) TDMA<br>(iv) FDMA | CO1 | PO2 |
| g. | Standards that have not been approved by an organized body but have been adopted as standards through widespread use are:<br>(i) De facto<br>(ii) De jure<br>(iii) American national standards institute<br>(iv) Electronic Industries Association | CO1 | PO2 |
| h. | Which layer is used to link the network support layers and user support layers?<br>(i) session layer<br>(ii) data link layer<br>(iii) transport layer<br>(iv) network layer | CO1 | PO2 |
| i. | In Internet Protocol Version (IPv4), two devices on the Internet can never have the:<br>(i) different address<br>(ii) same address<br>(iii) unknown address<br>(iv) fixed address | CO1 | PO2 |
| j. | TCP/IP model does not have _____ layer but OSI model have this layer.<br>(i) Session layer<br>(ii) Transport layer<br>(iii) Application layer<br>(iv) Network layer | CO2 | PO1 |

**PART – B: (Short Answer Questions)** **(2 x 10 = 20 Marks)**

Q.2. Answer ***ALL*** questions [CO#] [PO#]

a. Define protocols and its key elements widely used in computer networking. CO2 PO2

b. If data is 0110111111111100 what is the transmitted data and if received data is 01111110000111011111011111011001111110. What is the actual data in HDLC framing? CO2 PO2

c. Write at least four differences between connectionless and connection-oriented communication. CO1 PO2

d. Find the error, if any, in the following IPv4 addresses. CO3 PO1

(i) 011.56.45.78 (ii) 186.7.8.256 (iii) 5.45.3.1.14 (iv) 11100010.23.14.67

e. Write at least four differences between connectionless and connection-oriented communication. CO1 PO2

f. What is Direct and Indirect delivery? Support with proper diagram. CO2 PO2

g. Write the differences in services provided by TCP and UDP. (At least two) CO3 PO1

h. Show the autonomous system with the following specifications:

| Sl.No. | Specifications | Sl.No. | Specifications |
|---|---|---|---|
| 01. | There are eight networks (Nl to N8). | 07. | R3 connects N2 and N8. |
| 02. | There are eight routers (Rl to R8). | 08. | R4 connects N7 and N6. |
| 03. | Nl, N2, N3, N4, N5, and N6 are Ethernet LANs. | 09. | R5 connects N6 and N3. |
| 04. | N7 and N8 are point-to-point WANs. | 10. | R6 connects N6 and N4. |
| 05. | Rl connects Nl and N2. | 11. | R7 connects N6 and N5. |
| 06. | R2 connects Nl and N7. | 12. | R8 connects N8 and N5 |

CO2 PO3

i. 'Piggybacking is an efficient solution for reducing the bandwidth utilization of the network'. Justify. CO3 PO2

j. Find the minimum hamming distance of the coding scheme in table given below: CO4 PO2

| Data words | Codewords |
|---|---|
| 00 | 000 |
| 01 | 011 |
| 10 | 101 |
| 11 | 110 |

**PART – C: (Long Answer Questions)** **(10 x 4 = 40 Marks)**

Answer ***ALL*** questions Marks [CO#] [PO#]

3. a. Differentiate between different types of network topologies with suitable diagram. 5 CO1 PO2

b. Compare the performance of TCP/IP and OSI reference model. 5 CO1 PO2

(OR)

c. Describe the various categories of connecting devices that operates on a network with a neat diagram. 5 CO2 PO1

d. Define Ethernet. Explain the Ethernet frame format prescribed by IEEE 802.3. 2+3 CO3 PO2

4. a. Explain CSMA and protocols with Collision detection (CD) and Collision Avoidance (CA) with a suitable diagram. 5 CO1 PO2

b. Define FHSS and explain how it achieves bandwidth spreading. 2+3 CO2 PO3

(OR)

c. What are the three criteria necessary for an effective and efficient network? 5 CO2 PO1

d. Discuss about persistent methods in CSMA with suitable diagrams. 2+3 CO3 PO2

| | | | | |
|---|---|---|---|---|
| 5. a. | Give an explanation of the various networking and internetworking devices used in data communication. | 5 | CO1 | PO2 |
| b. | Describe CRC (Cyclic Redundancy Check) with the following data (given in polynomial form):<br>Original Message: $x^6 + x^4 + x + 1$<br>CRC generator: $x^3 + 1$ | 5 | CO1 | PO1 |
| | (OR) | | | |
| c. | Explain a TCP connection using three-way handshaking. | 5 | CO4 | PO1 |
| d. | Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and Go-Back N error control strategy. All packets are ready and immediately available for transmission. If every 5$^{th}$ packet that A transmits gets lost (but no ACKs from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? | 5 | CO1 | PO1 |
| 6. a. | A bit stream 1101011011 is transmitted using the standard CRC method. The generator polynomial is x4+x+1. What is the actual bit string transmitted? | 5 | CO2 | PO2 |
| b. | What exactly does "data communication" mean? List the components that affect how well data is communicated. | 5 | CO1 | PO2 |
| | (OR) | | | |
| c. | Explain UDP operation in transport layer. | 5 | CO2 | PO2 |
| d. | What are the techniques used to improve the Quality of Service in a transport layer? | 5 | CO4 | PO2 |

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