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**BTECH**  
**(SEM VI) THEORY EXAMINATION 2023-24**  
**DATA COMMUNICATION NETWORKS**

**TIME: 3 HRS****M.MARKS: 100**

**Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

**1. Attempt all questions in brief.****2 x 10 = 20**

| Q no. | Question                                                                                                                | Marks | CO |
|-------|-------------------------------------------------------------------------------------------------------------------------|-------|----|
| a.    | What are some common applications of computer networks?.                                                                | 02    | 1  |
| b.    | What is the role of protocols and standards in network communication?                                                   | 02    | 1  |
| c.    | What is framing in the context of the data link layer?                                                                  | 02    | 2  |
| d.    | What are the main features of the Point-to-Point Protocol (PPP)?                                                        | 02    | 2  |
| e.    | Compare the data rates for Standard Ethernet, Fast Ethernet, Gigabit Ethernet, and Ten- Gigabit Ethernet.               | 02    | 3  |
| f.    | Explain the key features and characteristics of Standard Ethernet.                                                      | 02    | 3  |
| g.    | Change the following IPv4 addresses from dotted- decimal notation to binary notation. (i) 111.56.45.78 (ii) 221.34.7.82 | 02    | 4  |
| h.    | Discuss the main differences between IPv4 and IPv6 protocols.                                                           | 02    | 4  |
| i.    | How is HTTP related to WWW?                                                                                             | 02    | 5  |
| j.    | Write short note on UDP?                                                                                                | 02    | 5  |

**SECTION B**

**2. Attempt any three of the following:****3 x 10 = 30**

|    |                                                                                                                                                        |    |   |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|
| a. | What are the similarities and differences between OSI and TCP/IP models?                                                                               | 10 | 1 |
| b. | What are the advantages and disadvantages of using fiber optic cables?                                                                                 | 10 | 2 |
| c. | Provide an overview of the IEEE 802.11 standard for wireless LANs. What are its different versions, and how do they improve upon each other?           | 10 | 3 |
| d. | A router inside an organization receives the same packet with a destination address 190.240.34.95. If the subnet mask is \19. Find the subnet address. | 10 | 4 |
| e. | Describe cryptography. Explain Substitutional and transposition technique.                                                                             | 10 | 5 |

**SECTION C**

**3. Attempt any one part of the following:****1 x 10 = 10**

|    |                                                                                     |    |   |
|----|-------------------------------------------------------------------------------------|----|---|
| a. | Write short note on 1)Line Coding 2)Switching Techniques 3)IEEE Standards.          | 10 | 1 |
| b. | Differentiate between Circuit switching and Packet switching with suitable diagram. | 10 | 1 |

**4. Attempt any one part of the following:****1 x 10 = 10**

|    |                                                                                                                                       |    |   |
|----|---------------------------------------------------------------------------------------------------------------------------------------|----|---|
| a. | What are the primary differences between guided and unguided transmission media?                                                      | 10 | 2 |
| b. | Compare and contrast HDLC and PPP in terms of their features, functionalities, and suitability for different networking environments. | 10 | 2 |



PAPER ID-410420

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|                                                  |                                                                                                                                                          |                    |   |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---|
| <b>5. Attempt any one part of the following:</b> |                                                                                                                                                          | <b>1 x 10 = 10</b> |   |
| a.                                               | Discuss the concept of Quality of Service (QoS) in IEEE 802.11 networks. How is QoS implemented, and what benefits does it provide?                      | 10                 | 3 |
| b.                                               | How do we say collision detection is analog process? Why do we prefer CSMA over ALOHA? Prove that maximum efficiency of ALOHA is $1/e$                   | 10                 | 3 |
| <b>6. Attempt any one part of the following:</b> |                                                                                                                                                          | <b>1 x 10 = 10</b> |   |
| a.                                               | Why do we use subnet mask? Perform the subnetting of the following: IP address 160.111.x.x; Original subnet mask 255.255.0.0; Amount of subnets 6.       | 10                 | 4 |
| b.                                               | What are the differences between distance vector and link state routing protocols? Explain                                                               | 10                 | 4 |
| <b>7. Attempt any one part of the following:</b> |                                                                                                                                                          | <b>1 x 10 = 10</b> |   |
| a.                                               | Write short notes on: a) UDP b) TCP c) SCTP                                                                                                              | 10                 | 5 |
| b.                                               | Explain how does e-mail reaches to destination. Explain in brief SMTP emphasizing the role and function of User Agent (UA) and Mail Transfer Agent(MTA). | 10                 | 5 |