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| **Name. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Student Admn. No.: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | | | **Printed Pages:02** | | | | |
| **School of Computing Science and Engineering**  **End Term Examination (ETE), Debarred Class / Summer term, July 2024**  **[Programme: Computer Science and Engineering ] [Semester: III] [Batch: Summer Term ]** | | | | | | | | |
| **Course Title: Data Communication & Networking**  **Course Code: BCSE2370** | | | | **Max Marks: 100**  **Time:3 Hrs.** | | | | |
| ***Instructions:*** | | *1. All questions are compulsory.*   1. *Assume missing data suitably, if any.* | | | | | | |
|  | | | K Level | | COs | | | Marks |
| **SECTION-A (15 Marks) 5 Marks each** | | | | | | | | |
| **1.** | Discuss the advantages and limitations of wireless LANs (Wi-Fi) compared to wired Ethernet LANs in terms of performance and security. | | K1 | | | CO2 | 5 | |
| **2.** | In a mesh network topology with n devices, each device is directly connected to every other device. If there are 10 devices in the network, calculate the total number of physical links required for the mesh topology. | | K2 | | | CO3 | 5 | |
| **3.** | Explain the concept of throughput and its relationship with bandwidth and network congestion. | | K2 | | | CO1 | 5 | |
| **SECTION-B (40 Marks) 10 Marks each** | | | | | | | | |
| **4.** | Discuss the significance of multiplexing in data transmission. Define multiplexing and explain how it allows multiple signals to share a common communication medium. | | K2 | | | CO2 | 10 | |
| **5.** | Provide a comprehensive introduction to routing protocols. Explain the fundamental role of routing protocols in computer networks. Discuss how they enable routers to dynamically learn and exchange routing information. | | K3 | | | CO2 | 10 | |
| **6.** | Consider an OSPF network with three routers: Router A, Router B, and Router C. The link costs between the routers are as follows: Cost of the link between A and B: 5 Cost of the link between B and C: 3 Cost of the link between A and C: 8 Assuming that the routers are using OSPF and have exchanged their link-state information, calculate the OSPF routing table for Router A. Use the SPF (Shortest Path First) algorithm to determine the shortest paths and costs. | | K4 | | | CO3 | 10 | |
| **7.** | Examine the characteristics and applications of radio waves in wireless communication. Discuss the frequency ranges used for wireless communication and the factors influencing signal propagation. Illustrate with examples how radio waves are employed in different wireless technologies, such as Wi-Fi, Bluetooth, and cellular networks. | | K4 | | | CO5 | 10 | |
| **SECTION-C (45 Marks) 15 Marks each** | | | | | | | | |
| **8.** | Provide an in-depth analysis of Circuit-Switched Networks. Define circuit-switching and explain the fundamental principles behind its operation. Discuss how circuit-switched networks establish dedicated communication paths and the associated signaling processes. | | K4 | | | CO1 | 15 | |
| **9.** | Examine the principles and applications of Frequency-Division Multiplexing (FDM) in communication systems. Define FDM and discuss how it divides the available bandwidth into multiple frequency bands for simultaneous transmission. Analyze the advantages and challenges associated with FDM, and provide real-world examples where FDM is used to optimize bandwidth utilization. | | K5 | | | CO4 | 15 | |
| **10** | Explain the fundamentals of the Hypertext Transfer Protocol (HTTP) in the context of the World Wide Web. Discuss how HTTP enables the communication between web clients and servers. Explore the request-response model of HTTP, the structure of URLs, and the significance of status codes in web communication. | | K5 | | | CO3 | 15 | |