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| **DIT UNIVERSITY DEHRADUN**   |  |  | | --- | --- | | **B.TECH** | **MID TERM EXAMINATION, EVEN SEM 2023-24 (SEM VI)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Advanced Computer Networks** | | | | | | | | | | | | |

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| **Time: 2 Hours** | **Total Marks: 50** |
| **Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the exam.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  | | --- | --- | --- | | **Q.1)** | **Attempt all Parts :** | | |  | **(a)** | **How do routers exchange routing table updates in dynamic routing protocols such as RIP, OSPF, and BGP?** | |  | **(b)** | **Analyze frequency bands 2.4 GHz and 5 GHz used in wireless networks, and identify any two differences between them.** | |  | **(c)** | **How does Mobile IP enable mobile devices to maintain connectivity while moving between different networks?** | |  | **(d)** | **What happens if there are two or more paths to the same network with different metrics? Which path will be chosen?** | |  |  | **[4 x 2.5= 10]** | | **Q.2)** | **Attempt all Parts :** | | |  | **(a)** | **Assess the effectiveness of wireless network components in meeting the performance requirements and user expectations.** | |  | **(b)** | **A block of addresses is granted to a small organization. We know that one of the addresses is 194.168.32.56/30. What will be the first address and the last address in the block?** | |  | **(c)** | **Explain how Mobile IP works in a simplified scenario, highlighting its key components and the process involved when a mobile device moves from one network to another.** | |  | **(d)** | **In a cellular network, a particular cell has 30 available channels. If the reuse factor is 4, how many cells can exist within the same cluster? What is the total number of available channels for the entire cellular system?** | |  |  | **[4 x 2.5= 10]** | | **Q.3)** | **Attempt any Two Parts :** | | |  | **(a)** | **Consider a small network with four routers: A, B, C, and D, interconnected as follows:**  **A is directly connected to B and D.**  **B is directly connected to A, C, and D.**  **C is directly connected to B and D.**  **D is directly connected to A, B, and C.**  **The cost of each link is as follows:**  **A-B: 2**  **A-D: 3**  **B-C: 1**  **B-D: 2**  **C-D: 2**  **Assume that the initial distance vector at each router is:**  **Router A: (A:0, B:2, C:∞, D:3)**  **Router B: (A:2, B:0, C:1, D:2)**  **Router C: (A:∞, B:1, C:0, D:2)**  **Router D: (A:3, B:2, C:2, D:0)**  **Calculate the distance vectors at each router after one iteration using RIP.** | |  | **(b)** | **Suppose you are tasked with optimizing the coverage of a cellular network in a rural area with low population density. How would you strategically place cell towers to ensure the best coverage while minimizing infrastructure costs?** | |  | **(c)** | **Describe the differences between RIP and RIPng regarding addressing and protocol features.** | |  |  | **[2 x 5= 10]** | | **Q.4)** | **Attempt any Two Parts :** | | |  | **(a)** | **A cellular network operates with a frequency reuse factor of 3. Each cell in the network uses a total of 40 MHz of frequency spectrum for communication. Calculate the total available frequency spectrum in the network and determine the bandwidth allocated to each cell if there are 30 cells in total.** | |  | **(b)** | **Compare the various versions of IEEE 802.11.** | |  | **(c)** | **An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows.**  **a. The first group has 200 medium-sized businesses; each needs 128 addresses.**  **b. The second group has 400 small businesses; each needs 16 addresses.**  **c. The third group has 2000 households; each needs 4 addresses.**  **Design the sub-blocks and give the slash notation for each sub-block. Find out how many addresses are still available after these allocations.** | | **[2 x 5= 10]** | | | | **Q.5)** | **Attempt any Two Parts :** | | |  | **(a)** | **Compare and contrast the advantages and disadvantages of OSPF compared to RIP routing protocols.** | |  | **(b)** | **Explain in detail about the following related cellular communication systems:**   1. **Frequency Reuse** 2. **Hand-off mechanisms** | |  | **(c)** | **Assume that source S and destination D are connected through two intermediate routers labeled R. Explain how many times each packet must visit the network layer and the physical layer during transmission from S to D.**  **Lightbox** | |  |  | **[2 x 5= 10]** | | **-----END OF PAPER ----** | | | | |