Subject: Data Structures   Duration: 3 Hours
Course Code: CA3201 / MA5207   M.M   : 60
Note: All Questions are compulsory

Q1. A linear array A is given with lower bound as 1. If address of A[25] is 375 and A[30] is 390, then find address of A[16].   **[5]**

Q2. Write an algorithm to reverse the order of elements on a stack S
       (i) Using two additional stacks.
       (ii) Using one additional queue.   **[5]**

Q3. Two Binary Trees are similar if they are both empty or if they are both nonempty and left and right sub trees are similar. Write an algorithm to determine if two Binary Trees are similar.   **[10]**

Q4. Draw a B-tree of order 3 for the following sequence of keys 2, 4, 9, 8, 7, 6, 3, 1, 5 and 10.   **[10]**

Q5. Can a Queue be represented by circular linked list by using only one pointer for front and rear both? If yes then write the algorithms for enque and deque, if no then justify your answer.   **[5]**

Q6. Suppose there are five cities namely Allahabad, Banaras, Chennai, Delhi and Jaipur. There exist direct flights between Allahabad to Banaras and Delhi having cost 5k and 3k respectively. Direct flight between Banaras to Chennai costs 2k. Chennai to Allahabad and Jaipur having cost 3k and 2k respectively. Delhi to Banaras and Jaipur having cost 1k and 4k repectively and Jaipur to Chennai having cost 3k. Now you want to travel all other cities from Allahabad. Use dijkstra algorithm to find the path from Allahabad to all other cities having minimum cost. Explain the each step with suitable diagram. (K is thousand rupees)   **[10]**

Q7. What do you mean by hashing? Explain any four popular hash functions with suitable example. **[5]**

Q8. Given a directed graph, find the minimum distance from node V3 to node V4 using Floyd-Warshall algorithm. Illustrate each step with suitable weight matrix.   **[10]**

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