

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO-2022)

CLASS: MCA/PRE-PHD
BRANCH: CSE

SEMESTER: I
SESSION: MO/2022

SUBJECT: CA405 DATA STRUCTURE AND ALGORITHMS

TIME: 03 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

-
- Q.1(a) What is the limitation of Big-Oh notation? [CO-2, PO-3, BT-2] [2]
Q.1(b) Why is a doubly linked list more useful than a singly linked list? [CO-1, PO-2, BT-2] [3]
Q.1(c) Discuss the best case, worst case and average case time complexity of an algorithm with a suitable example? [CO-2, PO-2, BT-4] [5]
- Q.2(a) How does linked stack differ from a linear stack? [CO-2, PO-3, BT-1] [2]
Q.2(b) Convert the given infix expression into its equivalent postfix expression (use algorithm to convert infix notation to postfix):
 $(A - B / C) * (A / K - L)$ [CO-1, CO-2, PO-3, BT-3] [3]
Q.2(c) Explain the concept of a circular queue? How is it better than a linear queue? [CO-1, CO-3, PO-5, BT-4] [5]
- Q.3(a) what is the difference between complete binary tree and strictly binary tree? [CO-1, CO-3, PO-2, BT-2] [2]
Q.3(b) Construct a binary tree from the given in-order and pre-order traversal:
In-order traversal: {4, 2, 1, 7, 5, 8, 3, 6} Pre-order traversal: {1, 2, 4, 3, 5, 7, 8, 6} [CO-2, CO-3, PO-4, BT-4] [3]
Q.3(c) How does the height of a binary search tree effect its performance? Construct an AVL tree by inserting the following elements in the given order: 63, 9, 19, 27, 18, 108, 99, 81? [CO-3, PO-3, BT-4] [5]
- Q.4(a) Why is quick sort algorithm better for arrays? [CO-4, PO-1, BT-1] [2]
Q.4(b) Determine the time complexities of quicksort in best and worst case? [CO-4, PO-2, BT-5] [3]
Q.4(c) Construct a heap (H) from the given set of numbers: 45, 36, 54, 27, 63, 72, 61, and 18. Also, while constructing, draw the memory representation of the heap? [CO-3, CO-4, PO-2, PO-3, BT-4] [5]
- Q.5(a) What is the purpose of minimum spanning tree? [CO-5, PO-1, BT-2] [2]
Q.5(b) Explain breadth first search traversal method of a graph? [CO-3, CO-5, PO-3, PO-5, BT-3] [3]
Q.5(c) With suitable example of weighted graph distinguish the outcomes of Prim's and Kruskal's algorithm? [CO-3, CO-5, PO-4, BT-4] [5]

:::::22/11/2022:::::E