

2023

COMPUTER SCIENCE — HONOURS

Paper : CC-3

(Data Structure)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **question no. 1** and **any four** questions from the rest.1. Answer **any five** questions :

2×5

- (a) Mention the advantages of De-queue.
- (b) How the elements of a 2D array stored in the memory?
- (c) State the formal definition of a Linked list.
- (d) What is stack? State any two uses of stack.
- (e) Convert the following infix expression to its equivalent prefix expression.

$$A + B * C - D / E$$

- (f) Compare selection sort and bubble sort.
 - (g) State any two advantages of recursion.
 - (h) State any two advantages of using heap data structure over stack.
2. (a) Write an algorithm to insert an element in a circular linked list.
- (b) Write an algorithm to convert any infix expression into its corresponding postfix expression using stack and evaluate. 5+5
3. (a) Define a threaded binary tree.
- (b) What is 'dangling pointer' in Double threaded binary tree?
- (c) Write an algorithm to perform deletion operation in binary search tree (BST). Mention all the three cases. 2+2+(2+2+2)
4. (a) Write an algorithm to implement quick sort on an array of elements.
- (b) Derive the time complexity of merge sort.
- (c) State the differences between quick sort and merge sort. 5+3+2

Please Turn Over

5. (a) Write an algorithm to insert an element in a circular queue.
(b) Construct the binary tree from the following in-order and post-order traversal. All the steps must be clearly shown.
In-order : 4, 8, 2, 5, 1, 6, 3, 7
Post-order : 8, 4, 5, 2, 6, 7, 3, 1 5+5
6. (a) Define Max heap.
(b) Construct a max heap with the following elements and then arrange it in ascending order :
210, 7, 92, 98, 62, 147, 39, 35, 69
Show all steps. 2+(4+4)
7. (a) Explain any three hashing function with example.
(b) How is collision resolved using open addressing?
(c) State the main disadvantage of linear probing. 6+2+2
8. (a) State briefly the process of representing a queue with the help of stacks.
(b) What is priority queue? How is it maintained in memory? 4+(2+4)
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