

2019

COMPUTER SCIENCE — GENERAL

Paper : CC/GE-2

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** from the rest.

1. Answer **any five** questions from the following : 2×5
- (a) What are the differences between array and linked list?
 - (b) How can the polynomial $4x^3 - 15x^2 + 8$ be represented using a linked list?
 - (c) Define algorithm.
 - (d) Define ADT.
 - (e) Consider the array A [10] [10] of type integer (w=4). The base address of A is 3000. Find the address of the element at position A [2] [3] in the row-major order.
 - (f) What is the prerequisite of binary search technique?
 - (g) $ABC + * CBA - + *$ is a post-fix expression with the assumption $A = 1$, $B = 2$ and $C = 3$. Compute the final value obtained if the expression is evaluated.
 - (h) Briefly differentiate between Queue and Circular Queue.
2. (a) Write algorithm for the following stack operations, using array implementation :-
- (i) Test if stack is FULL
 - (ii) Test if stack is EMPTY
 - (iii) Push an element to the stack
 - (iv) POP an element from the stack.
- (b) Write an algorithm to evaluate a given post-fix expression. (1+1+2+2)+4
3. (a) Convert the following infix expression to prefix and postfix :
 $((a + b) * C) / ((a - b) * d)$. Show all the steps.
- (b) Write an algorithm to insert a node at the beginning of a linked list. (3+3)+4

Please Turn Over

4. (a) How are stacks different from queues? Explain with examples.
- (b) Write an algorithm for Bubble sort. 5+5
5. (a) Given a linked list of integers. The length of the linked list is odd. Give an algorithm to extract the content of the middle node of this given list. Illustrate the algorithm with an example.
- (b) Write an algorithm to search an element from an array using linear search method. 5+5
6. (a) Write an algorithm to merge two sorted array so that the final array is also sorted.
- (b) State the advantages and disadvantages of recursion. 5+5
7. Write an algorithm to insert into and delete elements from a queue. Check the full and empty conditions also. 5+5
8. Write algorithms for the following operations on singly linked lists : 4+3+3
- (a) Creation of a singly linked list.
- (b) Traversal of a singly linked list.
- (c) Searching a given element in the singly linked list.
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