

Total No. of Printed Pages:2

S.E. Computer (Sem-III) (Revised Course 2016-2017) EXAMINATION MAY/JUNE 2019
Data Structures And Algorithms -I

[Duration : Three Hours]

[Max.Marks : 100]

Instructions:

- 1) Answer **any two** questions from **Part-A**.
- 2) Answer **any two** questions from **Part-B**.
- 3) Answer **any one** question from **Part-C**.
- 4) Make **suitable** assumptions **wherever** necessary.

PART A

- Q.1
- a) Explain the various cases while inserting a node in a doubly linked list with the help of diagrams and C functions. 10
 - b) State the advantages of the following: 04
 - i) Doubly linked list data structure
 - ii) Circular queue data structure
 - c) Explain the various operations of a queue data structure. Write C functions to implement the various operations of a queue data structure using single linked list. 06
- Q.2
- a) Write a C function to delete duplicates from a sorted linked list. 06
 - b) Write C functions to implement output restricted Deque data structure. 06
 - c) Explain the following: 08
 - i) Reversing a double linked list.
 - ii) Concatenating two single linked lists.
 - iii) Traversing the circular linked list.
- Q.3
- a) Write a C function to move the largest element to the end of a single linked list. 04
 - b) Explain the various cases while deleting an element from a doubly linked list and from a circular linked list with the help of diagrams and C functions. 12
 - c) Explain the different ways in which structures can be passed as arguments to function. 04

PART B

- Q.4
- a) Convert the following infix expression to postfix expression and evaluate the postfix expression, using the stack data structure.
 $(4^2*3-3+(4*6/3)^2)$ 10
 - b) Write C functions to multiply two polynomial that are represented as single linked list. 06

- c) Explain the analysis of insertion sort. 04
- Q.5 a) Explain the algorithm to sort the elements using the radix sort. Trace the algorithm for the following data. 10
- 132 546 314 896 023 345 478 234 567 876 489 089
- b) Write recursive C functions for the following: 06
- i) to find a quotient of an integer number
- ii) to find a remainder of an integer number
- c) Write a C function to implement binary search. 04
- Q.6 a) Explain the different hash collision resolving techniques with examples. 10
- b) Write C functions to sort the elements in an array in the descending order using quick sort. 06
- c) Explain how tail recursion is different compared to a conventional recursive call. 04
- PART C**
- Q.7 a) Write a C function to sort the linked list in the descending order using bubble sort technique. 06
- b) Write the recursive C function to reverse a single linked list. 06
- c) Explain how priority queues can be implemented using sorted linked list with the help C functions. 08
- Q.8 a) Write C functions to implement the single linked list with the header node. 08
- b) Write C functions to validate if a string is a palindrome string or not using stack data structure. 08
- c) Explain the flow of control in a recursive function call. 04