

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2064)

14842

MCA 2nd Semester Examination
Data Structure (C++ & Java) (N.S.)
MCA-201

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt FIVE questions selecting one from each section. Section E is compulsory. All questions carry equal marks.

SECTION - A

1. (a) What are the various data types supported by C++? Explain each in detail.
- (b) What do you mean by Dynamic Memory Allocation? How dynamic memory is allocated to a 2D array and used? Explain with the help of example. (12)
2. (a) What is a constructor and a destructor? Explain with the help of an example. What are the various rules associated with the declaration and use of these.
- (b) Write an algorithm to insert an item at a given position in array and to delete an item from a given position. (12)

SECTION - B

3. (a) How a polynomial can be stored using linked list? Write an algorithm stores two polynomials in two linked lists and add them. Store the resultant polynomial in third list.
- (b) Write an algorithm to reverse the nodes of a linked list. (12)

14842/130

[P.T.O.]

4. (a) Discuss how a single array can be used to implement two stacks. Illustrate with the help of example.
- (b) Write an algorithm to insert an item in a circular queue. (12)

SECTION - C

5. (a) Write an algorithm to traverse a pre-order Threaded Binary Tree.
- (b) Write an algorithm to insert an item in a heap. (12)
6. (a) Write an algorithm to remove an item from a Binary search tree.
- (b) Write an algorithm for Depth-first-search traversal of graph. (12)

SECTION - D

7. (a) What is Hashing? What are the various hash functions? Discuss each with the help of suitable example.
- (b) What is omega and theta notations of measuring complexity? Discuss with example. (12)
8. (a) Derive the time complexity in Big O notation of Bubble sort and Quick sort in average and worst case.
- (b) Write steps to perform Radix sort algorithm. Illustrate with example and derive its time complexity. (12)

SECTION - E

9. Fill in the blanks.
- (a) Which arithmetic operation is not allowed on pointers?
- (b) How infinite loop is constructed in C++?
- (c) When a constructor is invoked?

- (d) Which linear data structure is not conducive for insertion and deletion?
- (e) Which data structure is used to check whether a given expression is balanced in parenthesis?
- (f) Which data structure is best suitable for the implementation of priority queue?
- (g) Can a Threaded Binary Tree be constructed for all traversals?
- (h) What is the condition for a Binary search Tree to give search efficiency of $O(\log n)$?
- (i) Define Adjacency Matrix for the representation of graph.
- (j) Explain Linear Probing for collision resolution in hashing.
- (k) Define Omega notation for complexity.
- (l) Which sorting method is highly space complex?

(1×12=12)