



PG – 385

II Semester M.C.A. Examination, July 2017
(CBCS)
COMPUTER SCIENCE
MCA – 201T : Data Structures

Time : 3 Hours

Max. Marks : 70

- Instructions :** 1) Part – A : Answer **any five** questions. (5×6=30)
2) Part – B : Answer **any four** questions. (4×10=40)

PART – A

A. Answer **any five**. Each question carries **six** marks. (6×5=30)

- 1) a) Why do we need data structures ? Mention data structure classification.
b) What is the best time and worst time complexity of linear search ?
- 2) Insert {7, 3, 2, 4, 6, 0} into a linear queue of size 4.
- 3) Differentiate between Depth First Search (DFS) and Breadth First Search (BFS) with an example.
- 4) What is polish expression ? Convert the following infix expression into postfix expression :
 $f*(g + (a + b/c))*e + d$
- 5) Write a code for concatenating two strings without using inbuilt function.
- 6) Write an algorithm for selection sort with its time complexity.
- 7) What are applications of the following data structures ?
 - a) Stack
 - b) Linked list.
- 8) a) What is typedef and why do we use ?
b) Write a recursive algorithm to solve tower of Hanoi with 3 discs.

P.T.O.



PART - B

B. Answer **any four**. Each question carries **ten** marks.

(4x10=40)

- 9) a) Brief on the concept of time and space complexity.
b) Write a program to convert infix to postfix expression.
 - 10) a) Why is binary search better than linear search ? Explain binary search technique with the help of an algorithm.
b) What is abstract data type ?
 - 11) Explain stack and queue operation in detail. Write algorithms for the same.
 - 12) Explain the concept of singly linked list by creating node, inserting node and displaying nodes with the help of programming.
 - 13) With necessary algorithm, sort the following using merge sort :
{42, 23, 74, 11, 65, 57, 94, 36, 99, 87, 70}
 - 14) Write short notes on :
 - a) Binary search tree insertion and deletion operation.
 - b) Define : Binary tree, complete graph and directed graph.
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PG – 498

II Semester M.C.A. Examination, June 2016
(CBCS)
COMPUTER SCIENCE
MCA – 201 T : Data Structures

Time : 3 Hours

Max. Marks : 70

PART – A

Answer **any five** questions.

(5×6=30)

1. What are Asymptotic notations ? Explain.
2. Define data structure and explain various operations on data structures.
3. Explain with an algorithm traversal of linear arrays.
4. Sort the given elements using bubble sort : 99, 88, 77, 66, 55, 44, 33, 22.
5. Explain the insertion and deletion operations in a Singly linked list.
6. Convert the given infix expression into its postfix form : $A/(B * C) + D * E - A^C$.
7. Write a recursive function to calculate Fibonacci series.
8. Give the algorithm for DFS.

PART – B

Answer **any four** questions.

(4×10=40)

9. a) Explain Boyer-Moore string pattern matching algorithm. 6
b) What are Abstract data types ? 4
10. a) Explain Binary search technique with the algorithm. 6
b) Explain sparse matrices. 4

P.T.O.



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| 11. Explain types of Linked lists with examples. | 10 |
| 12. a) Differentiate between circular queue and double ended queue. | 4 |
| b) Explain push and pop operations on stack. | 6 |
| 13. With relevant functions explain tree traversal techniques. | 10 |
| 14. Write short notes on : | |
| a) Heap Sort. | 6 |
| b) Applications of Stacks. | 4 |
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PG – 510

II Semester M.C.A. Examination, June 2015
(CBCS)
MCA – 201T : DATA STRUCTURES

Time : 3 Hours

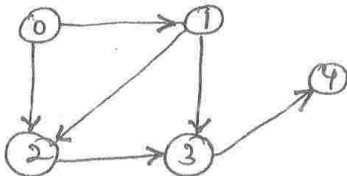
Max. Marks : 70

PART – A

Answer **any five** questions :

(5×6=30)

1. What is recursion ? What are the various types of recursion ? Explain with an example.
2. What do you mean by asymptotic behaviour of a function ? What are the different types of asymptotic notations ?
3. Write an algorithm to sort 'n' numbers using selection sort.
4. What is a sparse matrix ? Design an algorithm to search an item in sparse matrix.
5. What is ADT Stack ? Write an algorithm to convert expression from infix notation to postfix notation.
6. What is a weighted graph ? Write the adjacency matrix for the following graph :



7. What is a priority queue ? Explain operations and applications of queues.
8. What is a binary search tree ? What are the different types of binary search trees ? Explain.

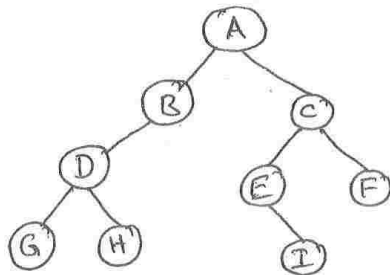
P.T.O.



PART - B

Answer **any four** questions :**(4×10=40)**

9. a) Write an algorithm to illustrate Bubble Sort. Write the time complexity. **5**
 b) Write a recursive program to find the factorial of 'n'. **5**
10. a) Illustrate the concept of circular queue. **5**
 b) Obtain the prefix expression for $((a + (b - c) * d) ^ e + f)$. **5**
11. a) List out differences between singly linked list and doubly linked list. **5**
 b) Write an algorithm to concatenate two lists into a single list. **5**
12. a) What is tree traversing ? What is pre-order traversing for the following tree : **5**



- b) Given a doubly linked list with elements {5, 6, 9, 10, 12} 5 being the first element, and 12 being the last element, write an algorithm to insert element in the doubly linked list and show the proof for inserting an element between 6 and 9. **5**
13. a) Sort {6, 9, 4, 3, 7, 5} using minimum heap, heap sort algorithm. **5**
 b) Write a function to insert an item into a binary search tree. **5**
14. Write short notes on : **10**
 i) Warshall's Algorithm
 ii) Row major representation of a matrix.