Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(IT) (2015 Onwards) (Sem.–2)

DATA STRUCTURES

Subject Code : MSIT-203

Paper ID : [72730]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.**
2. **SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.**

SECTION-A

Q1. Write an algorithm to convert infix to postfix expression. Apply the same on the following expression.

$$d + (x * y + (a / b \uparrow q) + n) * z$$

Q2. Write an algorithm to insert a new node in the existing sorted single linked list. Discuss your algorithm with the help of a suitable example.

SECTION-B

Q3. What are AVL trees? Explain various rotations performed on an AVL tree while inserting elements. Give examples.

Q4. What is a heap? How it is used in heap-sort? Write algorithm for heap-sort and discuss with following example.

12 38 15 19 52 48 74 50 45

SECTION-C

Q5. Explain and compare graph traversals techniques BFS and DFS.

Q6. Define Graph. Discuss the various memory representations techniques used for graph with the help of an example. Discuss various types of graphs.

SECTION-D

Q7. Explain the binary search algorithm using a suitable example. How binary search differs from linear search?

Q8. What do you mean by Hashing? Explain various methods of hashing. How collisions are handled during addressing in hashing?

SECTION-E

Q9. Answer briefly :

a) How you can traverse elements of a binary tree? Explain with example.

b) Compare stack and queue data structures.

c) Discuss memory representations of a binary tree in memory.

d) Write algorithm for bubble sort.

e) What are linear and non-linear data structures?

f) Discuss mathematical notations used for algorithms complexity.

g) Compare single and double linked list.

h) Discuss Radix sort with example.

i) Compare Array and Linked list.

j) Discuss tree traversals.