Roll No. .....

Total No. of Questions : 13] **[Total No. of Pages : 02**

Paper ID [A0209]

(Please fill this Paper ID in OMR Sheet)

BCA (204) (S05) (O) (Sem. - 2nd)

DATA STRUCTURES

Time : 03 Hours **Maximum Marks : 75**

Instruction to Candidates:

1) Section - A is **Compulsory**.

2) Attempt any **Nine** questions from Section - B.

Section - A

Q1) ***(15 × 2 = 30)***

a) What is recursion? What are its drawbacks?

b) What is a stack? Explain different operations on stack.

c) Explain the difference between array and linked list in terms of insertion and searching of any data item.

d) In finding out the complexity of any algorithm, explain the time space trade-off.

e) Define the terms Path Matrix and strongly connected.

f) Differentiate between Binary and Binary Search Tree.

g) Describe the BIG Oh notation.

h) What do you mean by doubly linked list?

i) Which is more efficient Breadth first Search or Depth first Search? Why?

j) How does Heap sort work?

k) Give advantage of binary search algorithm

l) List the various types of queues.

m) What are the various non-linear data structures?

n) What is dynamic storage management?

o) Write short note on recursion.

Section - B

(9 × 5 = 45)

Q2) Write an algorithm to sort integers using selection sort.

Q3) Write an algorithm to find the depth of a binary tree.

Q4) What do you mean by a heap? Write an algorithm for a heapsort.

Q5) Write the postfix form of the following expressions:

(A + B) * D + E / (F + G * H) + K and (A * B) / C + (E * F) +H * (G + J).

Q6) Implement bubble sort for doubly linked lists. What is its complexity?

Q7) Suppose a binary tree T is in memory. Write a function that finds similar elements.

Q8) Implement a circular queue with the help of an array.

Q9) Consider the following postfix expression:

(a) 5,3,+,2,*,6,9,7,-,/,-

(b) 6,10,+,12,8,-,*,8,2,-,4,^,+

Translate each expression into infix notation and then evaluate.

Q10) Write a function that adds a new node after a given location in a linked list.

Q11) Sort the following numbers using bubble sort: 66 77 11 88 99 22 33 55 44 03 02.

Q12) Draw the tree from the expression: $(6x-9) / (2z-5y)^2$ and compute its in-order, post-order and pre-order traversals.

Q13) Write an algorithm to find the number of elements in a queue.