(Please write your Exam Roll No.) **Exam Roll No.** 00835304416

END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE 2017

Paper Code: MCA-102 ***Subject: Data & File Structure***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 **(2.5x10=25)**

(a) Explain various asymptotic notations for representing time complexity.
(b) Differentiate between B^+ Tree and B* Tree.
(c) Explain preorder traversal of a binary tree.
(d) What do you mean by AVL tree? How the balance factor of a node in an AVL tree is computed.
(e) Explain shell short using suitable example.
(f) Write any two disadvantages of sequential file allocation method.
(g) What is dequeue?
(h) What do you mean by a heap? How is it different from a binary search tree?
(i) Explain adjacency list representation of a graph.
(j) What is a circular linked list? Write its advantages over a linear linked list.

Q2 (a) Write algorithms for insertion and deletion of an element in a linear queue. **(6.5)**

(b) Convert the following infix expression into postfix expression: **(6)**

$a/b - c + d * e - a * c.$

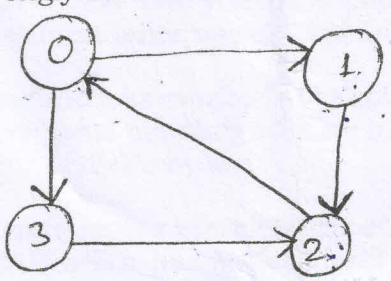
Q3 (a) Write a c function that adds two polynomials which are passed as its arguments. **(6)**

(b) Prove that the maximum no. of nodes on level i of binary tree is 2^{i-1} for $i \geq 1$ and maximum no. of nodes in a binary tree of depth K in $2^K - 1$ for $K \geq 1$. **(6.5)**

Q4 (a) Explain the concept of a threaded binary tree. Write algorithm for inserting a node in a threaded binary tree. **(6.5)**

(b) Write algorithm for deletion of a node in a binary search tree. **(6)**

Q5 (a) What do you mean by strongly connected graph. Is the directed graph shown below strongly connected? List all the simple paths in it. **(6.5)**



(b) Write an algorithm for breath first search of a graph. **(6)**

Q6 (a) Prove that in a complete graph with n vertices, no. of spanning trees is at least $2^{n-1} - 1$. **(6)**

(b) Write Prim's algorithm for finding the minimum cost spanning tree. **(6.5)**

Q7 (a) Short following integers using heap sort: **(6)**

8, 25, 16, 21, 45, 19, 17, 67, 52, 69, 70.

(b) Explain various parity & error control techniques in files. **(6.5)**

Q8 Write short notes on following: **(4+4+4.5=12.5)**

(a) Hashing (b) B^+ tree (c) Coloring of graphs

****

P