

46/306

(Please write your Exam Roll No.)

Exam Roll No. 0125040415

END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY - JUNE 2016

Paper Code: MCA102

Subject: Data & File Structure

Time: 3 Hours

Maximum Marks: 75

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

Q1 (a) Compute the time complexity of the following code segment written in C. (5x5=25)

```
for (j=1; j<n, j = K*j) Statement 1;
```

Assuming that n is size of input data and K is a constant.

- (b) Implement multistacks using on 1D array. Write algorithms for push and pop operation in the ith stack.
- (c) Write a c function that detects a circle within a linear linked list.
- (d) Prove that for any non empty binary tree T, if n₀ is the number of leaf nodes and n₁ is the number of nodes of degree 2, then n₀ = n₁ + 1.
- (e) Prove that the sum of the degrees of the vertices of an undirected graph is twice the number of edges.

Q2 (a) Write a C function to evaluate a postfix expression. (6.5)
 (b) What do you mean by a sparse matrix? Write procedure to add two sparse matrices. (6)

Q3 (a) Write C functions to delete and add a node in a doubly linked list (6.5)
 (b) How is a circular queue advantageous over a queue linear? Explain the addition and deletion operations in it. (6)

Q4 (a) How AVL tree is useful over a binary search tree? Insert following nodes with key values 10, 20, 30, 42, 28, 29, 50 in the order of their existence. (6.5)
 (b) What is a threaded binary tree? Write a C function to delete a node from this tree. (6)

Q5 Explain various techniques of a graph representation. Describe Floyd Warshall's algorithm with suitable example. (12.5)

Q6 (a) Explain Kruskal's algorithm of minimum spanning tree with suitable example. (6.5)
 (b) What do you mean by a binary search tree? Write procedures for various traversals of this tree. (6)

Q7 (a) Explain with suitable example the radix sort and compute its time complexity. (6.5)
 (b) What do you mean by sequential file organization? Explain its advantages and disadvantages. (6)

Q8 (a) What is B+ tree indexing? Explain with suitable example. (6.5)
 (b) Explain different collision resolution techniques in hashing. (6)

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