END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE 2018

Paper Code: MCA-102　　　　　　　　**Subject: Data and File Structures**

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

Note: Attempt all questions as directed. Internal choice is indicated.

PART-I

Q1　Attempt **any ten** questions. Each question carries equal marks.

(2.5x10=25)

(a) Which sorting algorithm is best if the list is already sorted and why?

(b) What is the maximum possible number of node in a binary tree at level 6?

(c) Which data structure is applied when dealing with a recursive function?

(d) Are linked lists considered linear or non linear data structure?

(e) Differentiate NULL and VOID.

(f) What is the advantage of heap over a stack?

(g) How do signed and unsigned numbers affect memory?

(h) What is the minimum number of queues needed when implementing a priority queue?

(i) Explain doubly linked lists.

(j) What is the Empty ( ) member method?

(k) What are graphs? What are strongly connected graphs?

(l) Explain the concept of primitive data structure.

PART-II

Q2　(a) Compare two functions n^2 and $2^n/4$ for various values of n. Determine when second becomes larger than first. **(6.5)**

　　(b) How do you find the complexity of an algorithm? What is the relation between the time and space complexities of an algorithm? Explain with example. **(6)**

OR

Q3　(a) Write an algorithm to evaluate a postfix expression. Execute your algorithm as your input ab+cd+*↑. **(6)**

　　(b) Two linked lists contain information of the same type in ascending order. Write a module to merge them to a single linked list that is sorted. **(6.5)**

PART-III

Q4　(a) What is B-TREE? Define its order and degree with a suitable example of insertion. Find out the B-Tree for the following data: A, S, D, H, E, B, M, C, I, L, K, W, Q and X. **(7)**

　　(b) What are threaded binary tree? Why they are needed in terms of memory? Make the threaded binary tree for the given data 22, 4, 12, 7, 14, 34, 23, 1, 3, 24, 13, 21, 34, 2. **(5.5)**

OR

Q5　(a) What is B –Tree? Define its order and degree with a suitable example of insertion. Prepare a binary tree from the given information of order: 4, 22, 4, 12, 7, 14, 34, 23, 1, 3, 24, 13, 21, 34, 2. **(7)**

P.T.O.

(b) What is AVL tree? Describe tree rotation in AVL tree (Right and left) with diagram and examples. (5.5)

PART-IV

Q6 (a) Draw the complete undirected graphs on one, two, three, four and five vertices. Prove that the number of edges in an n vertex complete graph is n(n-1)/2. (5.5)

(b) What is Quick Sort? Sort the following array using quick sort method: 24, 56, 47, 35, 10, 90, 82, 31. (7)

OR

Q7 (a) The following values are to be sorted in a hash table: 25, 42, 96, 101, 102, 162, 197. Describe how the values are hashed by using division method of hashing with a table size of 7. Use chaining as the method of collision resolution. (6.5)

(b) Consider the following specification of a Graph G: (6)
V(G)= {1, 2, 3, 4}
E(G)= {(1, 2), (1, 3), (3, 4), (4, 1)}
(i) Draw and undirected graph
(ii) Draw its adjacency matrix.

PART-V

Q8 (a) How do Binary Files work? Explain with example? (6)
(b) What is a text file? How do text files differ from other type of files? (6.5)

OR

Q9 (a) Explain Inverted files with example. (6)
(b) Explain Binary file with example. (6.5)

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