

MCA (Revised) / BCA (Revised)

Term-End Examination

08900

December, 2017

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 hours

Maximum Marks : 100

(Weightage 75%)

Note : *Question number 1 is compulsory. Attempt any three questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a) Write an algorithm for insertion of an element and deletion of an element from priority queue. 10
- (b) Explain quick sort algorithm and determine its complexity in best case and worst case scenarios. 10
- (c) Explain garbage collection and compaction methods with an example. 10
- (d) What is a threaded binary tree ? Explain with the help of examples. What are its advantages ? 10

2. (a) How do you represent both stack and queue using a one-dimensional array? 10
- (b) Generate a binary tree by traversing inorder and preorder sequences given below : 10
- Inorder : B, E, D, A, G, F, H, C
- Preorder : A, B, D, E, C, F, G, H
3. (a) Change the following infix expression into postfix expression : 10
- $$A - B (C * D - E) ^ F / G$$
- (b) Write a C program for inserting a new node at the end of a doubly linked list. Write its time complexity. 10
4. (a) Explain the memory representation of a lower triangular matrix. Determine the address formula of any element a_{ij} ; $1 \leq i \leq n$ in the lower triangular matrix if the elements are stored in row major order. 10
- (b) Write a C program to add two polynomials using a single variable. 10

5. (a) What is an AVL tree ? Explain the balancing methods of an AVL tree with an example. 10
- (b) (i) Define Hash function. Explain collision resolution strategies. 5
- (ii) What is a Sparse Matrix ? How do you represent a sparse matrix ? 5
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