

PMM/KS/15-7007

Fourth Semester B. E. (C. Tech.) (C. B. S.)  
Examination

DATA STRUCTURE AND PROGRAM DESIGN

Paper-2

Time : Three Hours ]

[ Max. Marks : 80

- N. B. : (1) All questions carry marks as indicated.  
(2) Solve six questions as follows :—  
Que. No. - 1 OR Que. No. - 2  
Que. No. - 3 OR Que. No. - 4  
Que. No. - 5 OR Que. No. - 6  
Que. No. - 7 OR Que. No. - 8  
Que. No. - 9 OR Que. No. - 10  
Que. No. - 11 OR Que. No. - 12

1. (a) Write an algorithm for binary search. Also discuss its time complexity. 8  
(b) Write an algorithm for Insertion Sort. 5

OR

2. (a) Explain following terms with proper example :—  
(i) Sparse matrix  
(ii) Recursion  
(iii) "Big O" notation. 6  
(b) Write a program to implement Merge Sort. Also, discuss its time complexity. 7

PMM/KS/15-7007

Contd.

3. (a) Write in brief about :—
- (i) Circular queue
  - (ii) Dqueue
  - (iii) Priority queue. 6
- (b) Write an algorithm for transforming infix expression into postfix form using stack. 7

OR

4. (a) Explain different applications and operations performed on stack. 6
- (b) Write a program to implement various operations on queue. 7
5. (a) Explain various types of linked list with proper representation and example. 5
- (b) Write a function to :—
- (i) Insert a node at specific position in singly linked list.
  - (ii) To search an element from a singly linked list. 8

OR

6. (a) Discuss "Dynamic Memory Allocation". 5
- (b) Write a function to :—
- (i) Insert a node at end in doubly linked list.
  - (ii) Delete a node from a specific position from doubly linked list. 8

7. (a) Write a non – recursive procedure for pre – order traversal of a binary tree. 6
- (b) Draw a expression tree for the following expression
- (i)  $(A+B)*C+D/(B+A*C)+D$
- (ii)  $(A/B)*C+D *E-A*C.$  8

OR

8. Define following terms with its example
- (i) Tree
- (ii) Binary tree
- (iii) Binary search tree
- (iv) Strictly binary tree
- (v) Full binary tree
- (vi) Complete binary tree
- (vii) AVL tree. 14
9. (a) Explain Prims algorithm to find minimum cost spanning tree with suitable example. 7
- (b) Define following terms with example :—
- (i) Topological sorting
- (ii) Critical path. 6

OR

10. Write down an algorithm for the following :—
- (i) Breadth first search
- (ii) Depth first search
- Also explain each with suitable example. 13

11. (a) Discuss fundamental file organization techniques.  
Discuss their merits and demerits. 7
- (b) Write in detail about Hashing technique. 7

OR

12. Write short notes on the following :—

- (a) Storage structure on tapes and disks
- (b) Indexed sequential file
- (c) Direct Access file
- (d) External sorting method. 3+3+3+4