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

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