2022

(February)

COMPUTER SCIENCE

(Elective/Honours)

(Data Structure Using C)

[CS–101 T]

Marks : 37

Time : 2 hours

The figures in the margin indicate full marks for the questions

Answer **one** question from each Unit

UNIT—I

1. *(a)* What is a flowchart? Draw a flowchart to determine whether a number is a prime number. 1+3=4

(b) What is a data type? Explain the different data types available in C. 2+3½=5½

2. *(a)* Define array. How does an array definition differ from that of an ordinary variable? 1+2=3

(b) What are the advantages and disadvantages of recursion over iteration? 4

(c) What is union of structures? 2½

UNIT—II

3. *(a)* What are the different characteristics of a linked list? 3

(b) What is a circular linked list? What are the advantages of a circular linked list? 1+2=3

4. *(a)* Explain stack with example. Explain the operation performed on stack. 2+2=4

(b) Convert the following infix expression to postfix expression : 2

((a b)/d (e f) g)

UNIT—III

5. *(a)* What is an AVL tree? Explain single rotation with the help of an example. 1+2½=3½

(b) Write a C function to search an element in a binary search tree. 3

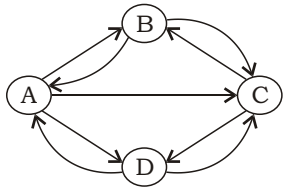
(c) Differentiate between height of a node and depth of a node. 2

6. *(a)* Briefly explain the different traversal techniques of binary tree. 5

(b) What is a threaded binary tree? Explain the different types of threaded binary tree. 1+2½=3½

UNIT—IV

7. *(a)* The following is a directed graph where there are no weights assigned to the edges. Construct the adjacency matrix and adjacency list for this graph. Also find the indegree and outdegree of each vertex : 2+3=5



(b) Differentiate between adjacency matrix and incidence matrix. 1½

8. *(a)* Write a C function to traverse a graph using Depth First Search method. 3

(b) What is a minimal spanning tree? Explain with example. 1+2½=3½

UNIT—V

9. *(a)* Write a C function to implement binary search. Compute its time complexity. 2+1=3

(b) Write an algorithm for performing bubble sort. 3½

10. *(a)* Define hashing. 1

(b) What is collision? Explain in brief the different collision resolution techniques. 1+4½=5½

★ ★ ★