

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

22D/14

(Turn Over)

(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

22D/14

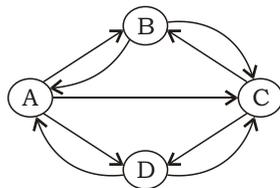
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(3)

- (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. $1+2\frac{1}{2}=3\frac{1}{2}$

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. $1\frac{1}{2}$

(4)

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. $1+2\frac{1}{2}=3\frac{1}{2}$

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. $3\frac{1}{2}$
10. (a) Define hashing. 1
- (b) What is collision? Explain in brief the different collision resolution techniques. $1+4\frac{1}{2}=5\frac{1}{2}$
