1/EH–73 (i) (Syllabus–2015)

2 0 1 8

(October)

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 for determining a prime number. 1+3=4

   (b) What are keywords in C? Give examples. 1½

   (c) What is meant by call by value and call by reference? 4

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

(Turn Over)

(b) What is a pointer? How is an int pointer variable declared? Why is it sometimes desirable to pass a pointer to a function as an argument? 1½+2=3½

(c) What is the purpose of typedef feature? Explain how typedef is used in conjunction with structures. 1+2=3

UNIT—II

3. (a) Explain the purpose of Big O notation. 2

(b) Distinguish among best, worst and average case complexities of an algorithm. 2

(c) What are the advantages of singly linked list? 2

4. (a) What is a stack? Explain the operations performed on stack. 1+1½+1½=4

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

$$((a + b) / d - (e * f) + g)$$

UNIT—III

5. (a) What is the difference between strictly binary tree and complete binary tree? 3

(b) Write a C function to find out the maximum element in a binary search tree. 3½

(c) If the root node is the only node present in the tree, can it be called a leaf node? Justify. 2

6. (a) Explain with example the different traversal techniques of binary tree. 3½

(b) Write notes on any two of the following : 2½×2=5

(i) Threaded binary tree

(ii) B-tree

(iii) AVL tree

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 in-degree and out-degree of each vertex : 4½
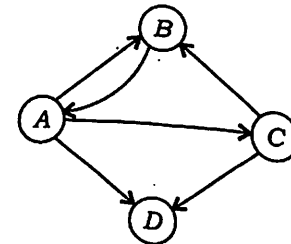
(b) What is meant by incidence matrix of a graph? 2

8. *(a)* Write a non-recursive C function to traverse a graph using depth first search method.   3

     (b) Explain the working of Dijkstra's algorithm for solving shortest path problem.   3½

UNIT—V

9. *(a)* Write a C function to implement linear search. Compute its time complexity.

                                           $2+1=3$

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

10. *(a)* What is hashing?   1

      (b) What is a collision? Explain in brief any two collision resolution techniques.

                                 $1½+2+2=5½$

★ ★ ★