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CB – 214

II Semester B.A./B.Sc. Examination, August/September 2023

(CBCS) (2014 – 15 and Onwards) (Repeaters)

COMPUTER SCIENCE (Paper – II)

Data Structures

Time : 3 Hours

Max. Marks : 70

Instruction : Answer *all* Sections.

SECTION – A

I. Answer **any ten** questions. **Each** question carries **2** marks.

(10×2=20)

- 1) Name any two linear and non-linear data structures.
- 2) What is space complexity and time complexity ?
- 3) Define sparse matrix. Give an example.
- 4) What is the use of malloc () function in C ?
- 5) Differentiate between linear search and binary search techniques.
- 6) What is doubly linked list ?
- 7) What is recursion ?
- 8) What is sorting ? Mention the advantages of insertion sort.
- 9) Convert the given infix expression $(A + B)/(A - B)$ to post-fix expression.
- 10) Define circular queue.
- 11) Define complete graph with example.
- 12) What is complete binary tree ?



SECTION – B

II. Answer **any five** questions. **Each** question carries **10** marks.

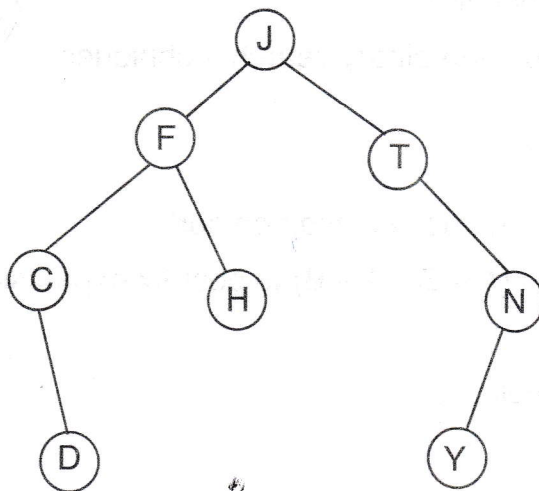
(5×10=50)

- 13) a) Discuss in detail the various operations on data structure. 6
- b) Briefly explain any two string handling functions with example. 4
- 14) a) Write an algorithm to insert an element into an array. 4
- b) Write a C program to search for an element in an array using linear search. 6

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- 15) a) Write a C program to implement bubble sort. 6
 b) Write a C program for tower of Hanoi. 4
- 16) a) What is a linked list ? Write an algorithm to insert an element at the end of a linked list. 6
 b) Evaluate the following postfix expressions : 4
 i) 5 6 2 + * 12 4 / -
 ii) 2 3 1 * + 9 -
- 17) Write a C program to implement the stack operation using arrays. 10
- 18) a) Define Queue. Explain various types of queues. 5
 b) Write an algorithm to insert and delete an element from a linear queue. 5
- 19) a) What is a binary tree ? Discuss its properties. 5
 b) Traverse the below tree in pre-order, in-order and post order. 5



- 20) a) Define the following : 5
 1) Graph
 2) Weighted graph
 3) Directed graph
 4) Degree of graph
 5) Null graph.
- b) Explain DFS graph traversals with an example. 5