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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2024-25 ONLY)

SUBJECT CODE 24 UCT 205

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2025

B.Sc. – COMPUTER TECHNOLOGY **MAXIMUM MARKS: 75**

II SEMESTER **TIME : 3 HOURS**

PART – III

DATA STRUCTURES

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. _____ of the following data structures is a linear data structure.

   a) Binary Tree b) Queue c) Graph d) Heap

2. In which data structure does "LIFO" operate?

   a) Stack b) Queue c) Array d) Graph

3. _____ is the maximum number of nodes in a binary tree at level 'l'.

   a) 2^(l-1) b) 2^l c) 2^(l+1) d) 2l

4. _____algorithm is used for merging sorted arrays.

   a) Quick Sort b) Bubble Sort c) Merge Sort d) Selection Sort

5. _____ is the complexity of binary search.

   a) O(n) b) O(n log n) c) O(log n) d) O(1)

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Define the term Data structure.
7. Indicate the main applications of queues.
8. Illustrate two types of linked lists.
9. Define and write short note about Binary search tree.
10. Illustrate the purpose of file indexing in file organization.

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Describe the properties of an algorithm.

(OR)

b) Apply a Procedure to demonstrate array operations.

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12. a) Compare the operations of a stack and a queue.

(OR)

b) Describe the concept of circular queues with an example.

13. a) Sketch and explain doubly linked lists.

(OR)

b) Demonstrate the operations of singly linked lists.

14. a) Describe the various types of binary trees.

(OR)

b) List the steps involved in an in-order traversal of a binary tree.

15. a) Differentiate between linear search and binary search.

(OR)

b) Demonstrate how to solve a quick sort problem with an example.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. a) Examine the classification of data structures and their importance.

(OR)

b) Conclude and explain an algorithm to find the largest element in an array.

17. a) Plan to write a Procedure to implement stack operations using an array.

(OR)

b) Point out the applications of stacks and queues in real-world scenarios

18. a) List the different types of linked lists with diagrams

(OR)

b) Develop a Procedure to insert and delete elements from a circular linked list.

19. a) Categorize the various representations of binary trees.

(OR)

b) Discus the concept of graphs, their terminologies, and applications

20. a) Compare and contrast the different file organization methods.

(OR)

b) Outline and explain the steps for merge sort along with an example.