; pages) Reg. No. : .....

ode No. : 10502 E **Sub. Code : CMCS 41**

.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2024.

Fourth Semester

Computer Science – Core

DATA STRUCTURE

(For those who joined in July 2021-2022)

me : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

Which of these best describes an array?

(a) A data structure that shows a hierarchical behaviour

(b) Container of objects of similar types

(c) Arrays are immutable once initialised

(d) Array is not a data structure

What is a sparse array?

(a) Data structure for representing arrays of records

(b) Data structure that compactly stores bits

(c) An array in which most of the elements have the zero value

(d) An array in which memory is allocated in run time

In linked list each node contain minimum of two fields. One field is data field to store the data second field is _____.

(a) Pointer to character (b) Pointer to integer

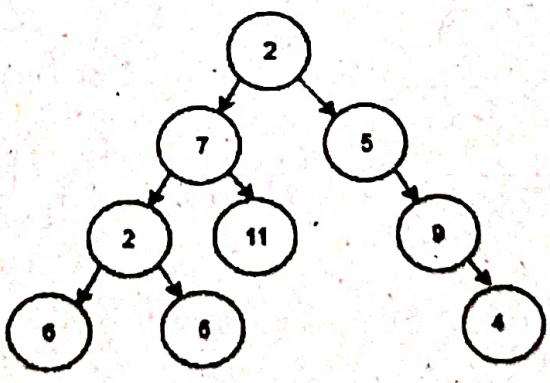
(c) Pointer to node (d) Node

Which among the below specified condition is applicable if the Queue is non - empty?

(a) rear > front (b) rear < front

(c) rear = front (d) Unpredictable

For the tree below, write the pre-order traversal.



(a) 2, 7, 2, 6, 5, 11, 5, 9, 4

(b) 2, 7, 5, 2, 6, 9, 5, 11, 4

(c) 2, 5, 11, 6, 7, 4, 9, 5, 2

(d) 2, 7, 5, 6, 11, 2, 5, 4, 9

What is a full binary tree?

(a) Each node has exactly zero or two children

(b) Each node has exactly two children

(c) All the leaves are at the same level

(d) Each node has exactly one or two children

Kruskal's algorithm is a _____.

(a) Divide and conquer algorithm

(b) Dynamic programming algorithm

(c) Greedy algorithm

(d) Approximation algorithm

Worst case is the worst case time complexity of Prim's algorithm if adjacency matrix is used?

(a) O (log V)

(b) O (V^2)

(c) O (E^2)

(d) O (V log E)

Merge sort uses which of the following technique to implement sorting?

(a) Backtracking

(b) Greedy algorithm

(c) Divide and conquer

(d) Dynamic programming

What is direct addressing?

(a) Distinct array position for every possible key

(b) Fewer array positions than keys

(c) Fewer keys than array positions

(d) Same array position for all keys

PART B — (5 × 5 = 25 marks)

nswer ALL questions by choosing either (a) or (b).
Each answer should not exceed 250 words.

(a) Write about Multi – dimensional array.

Or

(b) What is ADT? Give example.

(a) What is Linked list? How its memories are represented?

Or

(b) Discuss about Stack operation.

(a) What is Binary tree? Discuss about its application.

Or

(b) Write about conversion of infix to postfix operation.

14. (a) Write in details about Kruskal's algorithms.

Or

(b) Discuss about All Pair shortest path algorithm.

15. (a) Sort the following data by using Insertion sort. (12, 11, 13, 5, 6)

Or

(b) What is static hasing?

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) What is Array? Explain with example.

Or

(b) Explain in details about two dimensional array.

17. (a) Write ub details about Queue operations with example.

Or

(b) What is Sparse Matrix? Give example.

(a) Discuss in details about binary search tree insertion.

Or

(b) Illustrate Post order traversal with example data.

(a) Write and explain Prim's algorithms.

Or

(b) Discuss about detail Single source algorithm.

(a) How to sort the data b using Quick sort?

Or

(b) Sort the following data by using heap sort. {1, 3, 5, 4, 6, 13, 10, 9, 8, 15, 17}
