(6 Pages)

Reg. No. : ....

Code No. : 30583 E   **Sub. Code : AMCS 41**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2022

Fourth Semester

Computer Science — Core

DATA STRUCTURES

(For those who joined in July 2020 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The efficiency of a sequential search is ————

   (a) O(n)   (b) O(n*n)

   (c) O(log2n)   (d) O(n*n*n)

2. In ———— hashing, the key is squared and the address is selected from the middle of the result.

   (a) Direct   (b) Mid square

   (c) Subtraction   (d) Digit extraction

3. A ———— list is a linked list with two or more logical lists.

   (a) Circular   (b) Double linked

   (c) Multi linked   (d) Single linked

4. ———— a linked list means going through the list, node by node and processing each node.

   (a) Search   (b) Insert

   (c) Delete   (d) Traversing

5. ———— is an ordered list in which all insertions and deletions are made at one end called top.

   (a) Queue   (b) Trees

   (c) Graphs   (d) Stack

6. Which data structure allows deleting data elements from front and inserting at rear?

   (a) Stacks   (b) Queues

   (c) Dequeue   (d) Binary search tree

7. With ———— traversal, before visiting the root node, left sub-tree of the root node is to be visited then root node and after the visit of the root node right sub-tree of the root node will be visited.

   (a) preorder   (b) inorder

   (c) postorder   (d) both (a) and (c)

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8. An ———— is a binary tree which stores an arithmetic expression.

   (a) Heap tree   (b) Huffman tree

   (c) Expression tree   (d) Decision tree

9. A graph if it does not have any self loop or parallel edges is called ———— graph.

   (a) simple   (b) complete

   (c) weighted   (d) connected

10. A graph is said to be ———— if each vertex V_i is adjacent to every other vertex V_j in G.

   (a) simple   (b) complete

   (c) weighted   (d) connected

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) What is algorithm? What are the characteristics of a good algorithm?

Or

   (b) Describe the various levels of data abstraction.

12. (a) Elaborate the basic operations on stack.

Or

   (b) How do you create a singly linked list in data structure? Explain.

13. (a) What is a binary tree? Explain the various representations of binary tree.

Or

   (b) Write a procedure for insertion into a max heap.

14. (a) Write an algorithm for all pairs shortest paths.

Or

   (b) Explain the concept of graph abstract data type.

15. (a) Summarize the insertion sort algorithm with example.

Or

   (b) List out the advantages of external sorts.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Compare the space complexity and time complexity.

Or

(b) Illustrate they array as an abstract data type.

17. (a) Write a procedure to add and delete an element to a stack.

Or

(b) What is a queue? Explain the various operations performed on a queue.

18. (a) Write an algorithm to delete a particular node from binary search tree.

Or

(b) Explain the algorithm for preorder traversal of a binary tree.

19. (a) Compare the depth first search and breadth first search.

Or

(b) Outline the concept of minimum cost spanning trees.

20. (a) Discuss the balanced two-way merge sort with example.

Or

(b) What are the different types of hash function? Explain.

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