

Reg. No. :

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

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 :

The efficiency of a sequential search is _____

- (a) $O(n)$ (b) $O(n*n)$
- (c) $O(\log 2n)$ (d) $O(n*n*n)$

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

An _____ is a binary tree which stores an arithmetic expression.

- (a) Heap tree (b) Huffman tree
- (c) Expression tree (d) Decision tree

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

- (a) simple (b) complete
- (c) weighted (d) connected

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.

- a) What is algorithm? What are the characteristics of a good algorithm?

Or

- b) Describe the various levels of data abstraction.

- 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)

- 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 the 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.