

(7 pages)

Reg. No. :

Code No. : 30784 E Sub. Code : EMCA 31

B.C.A. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2024.

Third Semester

Computer Application — Core

DATA STRUCTURES AND ALGORITHMS

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. A linear collection of data elements where the linear node is given by means of pointer is called?
(a) Linked list (b) Node list
(c) Primitive list (d) Unordered list
2. Linked list is considered as an example of _____ types of memory allocation.
(a) Heap (b) Compile time
(c) Static (d) Dynamic

3. The minimum number of stacks needed to implement a queue is _____.
(a) 3 (b) 1
(c) 2 (d) 4
4. Which of the following is the infix expression?
(a) $A+B*C$ (b) $+A*BC$
(c) $ABC+*$ (d) None of the above
5. The number of edges from the root to the node is called _____ of the tree.
(a) Height (b) Depth
(c) Length (d) Width
6. What is an AVL tree?
(a) a tree which is balanced and is a height balanced tree
(b) a tree which is unbalanced and is a height balanced tree
(c) a tree with three children
(d) a tree with at most 3 children

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7. Which of the following statements for a simple graph is correct?
- (a) Every path is a trail
 - (b) Every trail is a path
 - (c) Every trail is a path as well as every path is a trail
 - (d) Path and trail have no relation
8. The data structure required for Breadth first traversal on a graph is?
- (a) Array
 - (b) Stack
 - (c) Tree
 - (d) Queue
9. Which of the following is false about a binary search tree?
- (a) The left child is always lesser than its parent
 - (b) The right child is always greater than its parent
 - (c) The left and right sub-trees should also be binary search trees
 - (d) In order sequence gives decreasing order of elements

10. What is the advantages of selection sort over other sorting technique?
- (a) It requires no additional storage space
 - (b) It is scalable
 - (c) It works best for inputs which are already sorted
 - (d) It is faster than any other sorting technique

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) (i) Define data structure.
(ii) List the various operations that can be performed on data structure.

Or

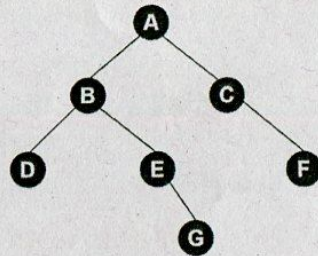
- (b) What is circular list? State the advantages of circular list over doubly linked list.
12. (a) What are the postfix forms of the expression?
- (i) $(A+B)*(C-D)/(P-R)$
 - (ii) $K + L - M*N + (O^P) * W/U/V * T + Q.$

Or

- (b) Define priority queue with diagram and give the operations.



13. (a) Write the postorder traversal procedure and find the postorder tree traversal.



Or

- (b) What is binary search trees? Give example.
14. (a) What is graph in data structure? Write about representation of graph.

Or

- (b) Discuss about depth first traversal.
15. (a) Write about linear search.

Or

- (b) What is rehashing? Explain.

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PART C — (5 × 8 = 40 marks)

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

16. (a) Explain ADT list with its operation.

Or

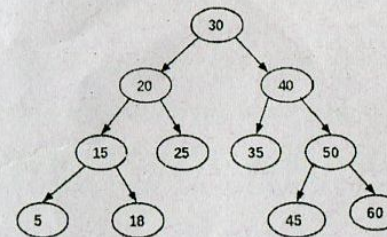
- (b) How the doubly linked list can be represented? Explain.

17. (a) Illustrate stack with its operations.

Or

- (b) Explain in detail about queue.

18. (a) Write pre-order, post-order, in-order for the following tree.



Or

- (b) Write note on B+ tree.

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19. (a) Discuss about types of graph.

Or

(b) Give detail about (i) Euler circuits (ii) Cut vertex.

20. (a) Explain in detail about bubble sort.

Or

(b) Summarize selection sort.

