

Data Structure Using C (313301)

MSBTE Diploma · K-Scheme · Model Question Paper — Set B

Time: 3 Hours**Max. Marks: 70****Instructions:**

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:**10**

- a) List any four operations performed on data structure.
- b) State any two differences between static and dynamic memory allocation.
- c) Write any two applications of stack.
- d) Define the following terms w.r.t. tree: i) Sibling ii) Depth of tree
- e) State any two applications of queue.
- f) Define heap. State its two types.
- g) List the types of binary tree traversal.

Q.2 Attempt any THREE of the following:**12**

- a) Describe the working of linear search. Search element 33 in the array {12, 45, 33, 7, 21}.
- b) Describe circular linked list with a neat diagram. State its advantages over linear linked list.
- c) With a neat sketch, explain the working of priority queue.
- d) Draw the expression tree for the following expression: $(2x + 3y)^2 - (a - 5b) / c$

Q.3 Attempt any THREE of the following:**12**

- a) Write an algorithm for inorder and postorder traversal of a binary tree.
- b) Convert the following infix expression into postfix form using stack. Show each step: $A * (B + C) - D / E$
- c) Write a 'C' program to create a singly linked list by inserting nodes at the end and display it.
- d) Differentiate between general tree and binary tree. (Any four points)

Q.4 Attempt any THREE of the following:**12**

- Find the position of element 72 using binary search in the array $A = \{8, 15, 23, 37, 48, 56, 72, 89, 95\}$. Show each step.
- Construct a binary search tree for the following elements and show each step: 60, 40, 80, 30, 50, 70, 90, 45, 85
- Show the effect of INSERT and DELETE operations on a linear queue of size 8. The queue contains 15, 25, 35 and 45 where 15 is at the front. Show diagrammatically: i) INSERT(55) ii) DELETE iii) INSERT(65) iv) DELETE
- Create a singly linked list using data fields 12, 24, 36, 48, 60. Search node 48 and show the procedure step-by-step with diagrams.
- Justify the statement: "Stack is an Abstract Data Type".

Q.5 Attempt any TWO of the following:

12

- Write a 'C' program to implement stack using array with PUSH, POP and display operations.
- Sort the following numbers in ascending order using selection sort and write the output after each iteration: {42, 17, 63, 8, 29, 51}
- Describe the implementation of queue using linked list with insert and delete operations and diagrams.

Q.6 Attempt any TWO of the following:

12

- Evaluate the following postfix expression using stack. Show the stack at each step: 5, 6, 2, +, *, 12, 4, /, -
- For the binary tree shown in Fig. 1, write the inorder, preorder and postorder traversal.

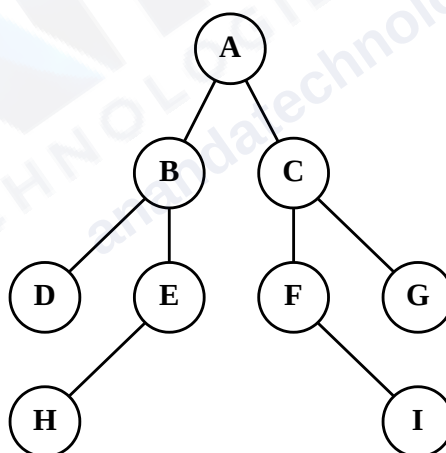


Fig. 1

- Explain any two applications of stack in detail with example.

Note: This is a **model question paper prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in