

Reg.No



Manipal Institute of Technology
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THIRD SEMESTER B.E (IT) END SEMESTER MAKEUP EXAMINATIONS – JANUARY, 2007
SUBJECT: DATA STRUCTURES – (ICT-205)
(REVISED CREDIT SYSTEM)

TIME: 3 HOURS

MAX.MARKS: 50

Instructions to Candidates:

- Answer any 5 FULL questions.
- All questions carry equal marks.
- Missing data may be suitably assumed

1A. List out different types of queues. Define each.

1B. Define Big-oh notation of time complexity of an algorithm. Arrange the given time complexities in the decreasing order of time.
 $O(\log n)$, $O(2^n)$, $O(n)$, $O(n^2)$, $O(n!)$, $O(n \log n)$

1C. Write a program to convert infix expression to prefix expression. (3+2+5)

2A. What is sparse ADT? Discuss its applications.

2B. Obtain the prefix and postfix expression for following

a. $(A+B^C^D)*(E+F/D)$

b. $A+B*C-D/E*H$

2C. Implement double ended queue using array and provide the following functions

- Insert an item from front end
- Insert an item from rear end
- Delete an item from front end
- Delete an item from rear end
- Display queue

Consider data in dequeue as Student record with rollno and name as data members.

(3+2+5)

- 3A. Write a program to check whether a given string is a palindrome or not using stack.
- 3B. What is threaded binary tree? List its advantages and disadvantages.
- 3C. Separate each digit in long integer and construct a singly linked list of those digits. Provide functions to insert, delete, replace and sort the list. (3+2+5 Marks)
- 4A. Write a function for binary search. Find the time complexity.
- 4B. Trace Insertion sort algorithm for following set of numbers 23, 11, 22, 45, 66, 43, 12, 34, 32, 9
- 4C. Write a program to multiply two polynomials, where polynomial is represented using circular linked list. (3+2+5 Marks)
- 5A. Construct a binary tree whose preorder and postorder traversals give the following sequence of vertices.
a. Preorder - ABCEIFJDGHKL
b. Postorder - IEJFCGKLHDBA
- 5B. Define
Binary tree
Strictly binary tree.
Complete binary tree
Almost complete binary tree
- 5C. Write a program to create and manage binary search tree with following functions.
- Inert a node
- Delete a node
- Update a node (3+2+5 Marks)
- 6A. Construct an expression tree for the following expression.
 $(a + b * c) + ((d * e + f) * g)$
- 6B. For a given big set of unsorted numbers, how insert sort, quick sort and merge sort together can be used, inorder to reduce the total time complexity of sorting N numbers.
- 6C. Define ascending and descending heap. Trace heap sort algorithm for 20, 33, 12, 22, 11, 34, 56, 30, 40. (3+2+5 Marks)
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