



Department of Computer Science & Engineering
Motilal Nehru National Institute of Technology Allahabad
Allahabad - 211 004 (India)

End Semester Examination 2016
MCA II Semester/M.Sc II semester
Subject: Data structure Using C

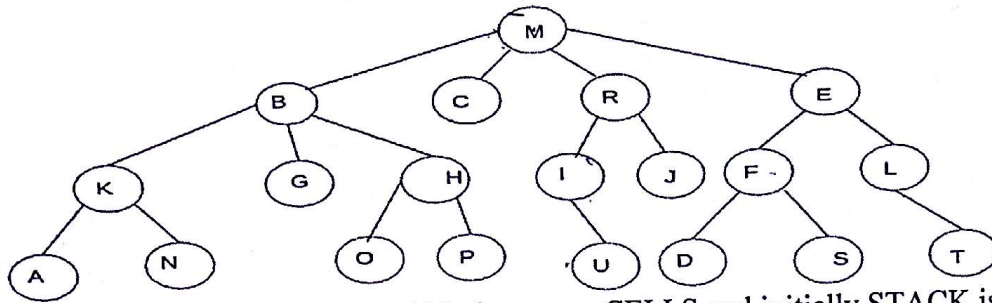
Duration: 3 Hrs

Max Marks: 60

Attempt Any 15 questions
All Questions carry equal marks.

- CA 3201
1. Define Data structures. Describe its need and types. List out the areas in which data structures are applied extensively
 2. Differentiate between Tree and Graph. Write applications of tree in computer Sc.
 3. What is Tower of Hanoi problem? Write the recursive code in C Language for the problem.
 4. What is circular Queue? Write an algorithm to insert an element in circular queue. Write all the condition for over flow.
 5. What is stack? Implement stack using singly link list.
 6. What do you mean by hashing and collision? Discuss advantages and Disadvantages of hashing over the searching techniques.
 7. What is Threaded binary tree? Explain with an Example.
 8. What is Forest? Write an algorithm to create a binary tree from a general tree.
 9. How do you find the complexity of an algorithm? What is the relation between the time and space complexities of an algorithm? Justify your answer with an example
 10. What is Binary search Tree? Create BST for the following data, show all the steps
20, 10, 25, 05, 15, 22, 3, 30, 14, 13

11. Convert following general Tree into binary Tree & perform inorder traversal



12. Consider the following stack is allocated N=6 memory CELLS and initially STACK is empty, or in other words TOP=0. Find out of the following

- Set AAA :=2 and BBB:=5
- CALL PUSH (STACK, AAA)
 - CALL PUSH(STACK, 4)
 - CALL PUSH (STACK, BBB+2)
 - CALL PUSH (STACK, 9)
- Repeat while TOP !=0
 - Call POP (STACK, ITEM)
 - Write : ITEM
 - [end of loop]
- Return.

13. Write a Program in C to create doubly linked list and Perform insertion and deletion at The beginning

14. (a) Convert the following infix expression into postfix expression by tabular method:

$$A*(B+D)/E - F * (G + H/K)$$

- (b) Evaluate following postfix expression and show the position of stack in each step:

$$5, 6, 2, +, *, 12, 4, 1, -$$

15. What is AVL tree? Explain the balancing methods of AVL trees with an example. Also obtain a height balanced tree starting from an empty tree and then on the following sequence of insertions: March, May, November, August, April, January, December, July, February, June, September. (Consider greater or less properties based on alphabetic ordering).

16. (a) If we have two polynomial $P(x) = 3x^5 - 4x^3 + 6x - 5$ and $Q(x) = 2x^8 + 7x^5 - 3x^2$ then with the help of linked list performed the operation and find the resultant polynomial R

- (b) Each element of an array DATA [20][50] requires 4 bytes of storage. Base address of DATA is 2000, determine the location of DATA [10][10] when array is stored as (i) row major (ii) column major

17. Build a Heap H from the following list of numbers. show all steps
46, 34, 52, 21, 64, 56, 79, 56

18. (a) What pointer type is used to implement the heterogeneous linked list in C? Explain
(b) Can we do a Binary search on a linked list?
(c) What is B Tree? Write applications of B tree.