

NTK/KW/15 – 7338

**Third Semester B. E. (Comp. Engg.)
Examination**

**PROGRAMMING METHODOLOGY AND DATA
STRUCTURES**

Time : Three Hours]

[Max. Marks : 80

- N. B. : (1) Due credit will be given to neatness and adequate dimensions.
(2) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Explain the role of different system programs in execution of a program. 6
- (b) What is ADT ? Explain its role in programming. 8

OR

2. (a) Write a C program using functions to ADD and MULTIPLY two numbers. 6
 - (b) What is a flowchart ? Explain different symbols used in design of a flowchart. Illustrate with example. 8
3. (a) What are different storage classes in C ? Explain. 6
 - (b) Explain the concept of dynamic memory allocation in C with example. 7

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Contd.

OR

4. (a) Write a note on following :—
(i) Structure and their pointers. 8
(ii) Pointer arithmetic. 8
- (b) Define recursion and explain. Write a recursive program to find factorial of a number. 5
5. (a) Write a C function/algorithm INSERTCOUNTC (A,N,NUMB) which sorts an array A with N numbers using INSERTION SORT and also counts number of comparisons NUMB. 6
- (b) Write an algorithm for binary search. Also give its time complexity. 7

OR

6. (a) Sort the array 77, 33, 44, 11,88, 22, 66, 55 Using selection sort radix sort and merge sort. Also compare their performances. 13
7. (a) Explain the concept of stack with its applications. Write a C program to perform PUSH and POP operations on stack. 7
- (b) Convert the following into equivalent postfix form indicating the stack positions:
(i) $P^{\wedge}Q+R-O-S+T/U+O$
(ii) $(A-B)/D+(F*A*D)$ 6

OR

8. (a) Explain circular queue. Write the algorithms for insertion and deletion operation on a circular queue. 9

(b) Write a note on priority queue. 4

9. Write C functions to perform following operations on a singly linked list.

(i) To add a node at the end of a list.

(ii) To add a node at the beginning of a list.

(iii) To delete a node at specified position.

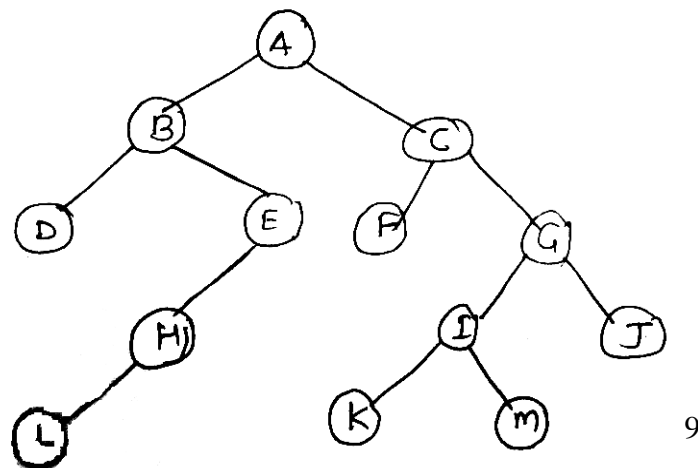
(iv) To sort a list. 14

OR

10. (a) Explain the concept of circular linked list. Also give advantages and disadvantages. 7

(b) Write a C program to reverse the links of singly linked list. 7

11. (a) Write a note on binary tree. Find the inorder, preorder and postorder traversal of the given tree.



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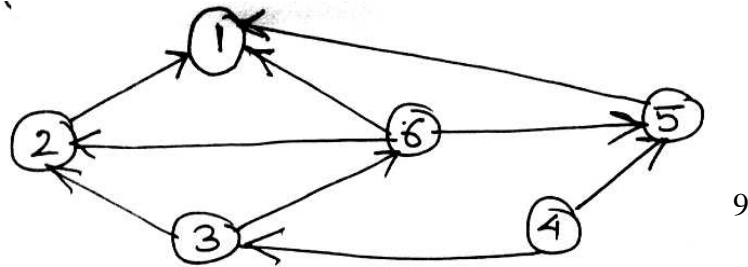
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(b) Explain the concept of BST with example. 4

OR

12. (a) What is a graph ? Explain. Also obtain :
- (i) Indegree and outdegree of each node.
 - (ii) The adjacency matrix.
 - (iii) The adjacency list and adjacency multilist for the given graph.



(b) Write the algorithm for Breadth first search and find BFS for the following.

