Total No of Questions:[12] *SEAT NO. :* [ ]

[Total No. of Pages : 4]

S.E. 2008 (DATA STRUCTURES)

(Semester -II)

Time: 3 Hours *Max. Marks : 100*

Instructions to the candidates:

1) *Answers to the two sections should be written in separate answer books.*
2) *Answer any three questions from each section.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of Calculator is allowed.*
6) *Assume Suitable data if necessary*

SECTION I

Q1) a) What is concept of a function in 'C' ? Explain function declaration, definition and function call with suitable example. [06]

b) Explain Binary search method to search number 78 from given table of numbers. How many passes are required to search 78 ? [06]

11, 23, 45, 67, 70,78,80

c) Define ADT. Explain its structure with example [06]

OR

Q2) a) Explain Bubble sort and insertion sort with example [08]
Comment on Time Complexity for above sorting methods

b) Define Recursive Function in 'C' and explain it with suitable example [06]

c) A two dimensional array is given as char x[3][3] , [04]
Explain with above example row major and column major storage representation in two dimensional arrays.

Q3) a) What is string. Explain at least three different string functions used in 'C' with example [08]

b) Explain bitwise operators each with example [06]

c) Write only structure template with its variable name to store a polynomial in 'x' with 7 terms having a float coefficient and integer exponent. [02]

OR

Q4) a) Explain parameter passing by value and by reference with example of swapping of two variables. [06]

b) Define following terms with example : [06]
Structure, Tag name, structure members, structure template , structure variable and array of structure.

c) Differentiate static and dynamic memory allocation [04]

Q5) a) Explain node structure of Singly Linked List, show Singly Linked List of 6 integer numbers. Clearly show head and tail node. [04]

b) Write 'C' function to insert a node in Singly Linked List with all possible conditions. [08]

c) Differentiate SLL with DLL [04]

OR

Q6) a) Define Circular Linked List and explain its advantages [04]

b) Write Algorithm to delete a node in Doubly Linked List [06]

c) Define GLL with node declaration and represent following polynomial using GLL. [06]

$$x^{10}y^3z^2 + 2x^8y^3z^2 + 3x^8y^2z^2 + x^4y^4z + 6x^3y^4z + 2yz$$

SECTION II

Q7) a) Explain the operating principle of stack. Also write functions for PUSH and POP operations related to stack. [06]

b) Elaborate the concept of priority queue. [06]

c) Convert the following expression to prefix and postfix form. [06]

A-B*C^D

Evaluate postfix expression for A=10, B=3, C=2, D=2 using stack.

OR

Q8) a) Give algorithm for evaluation of postfix expression. [06]

b) Write functions in 'C' to implement queue using linked list. [06]

c) Convert the following expression in other two forms [06]

i) a-b*d-c ii) x^y+2-z

Q9) a) Define following terms related to tree [06]

1. Sibling
2. Leaf Node
3. Complete Binary Tree
4. Depth of a tree
5. Height of Tree
6. Minimum Spanning Tree

b) Describe the algorithm for inorder traversal in BST. [04]

c) Write a 'C' function to search an element in binary search tree. [06]

OR

Q10) a) Construct the BST for following : [08]

M, X, A, C, L, Y, J, H, O, B, Z

Show traversals in all orders

b) Explain in detail Threaded Binary Tree with suitable example [08]

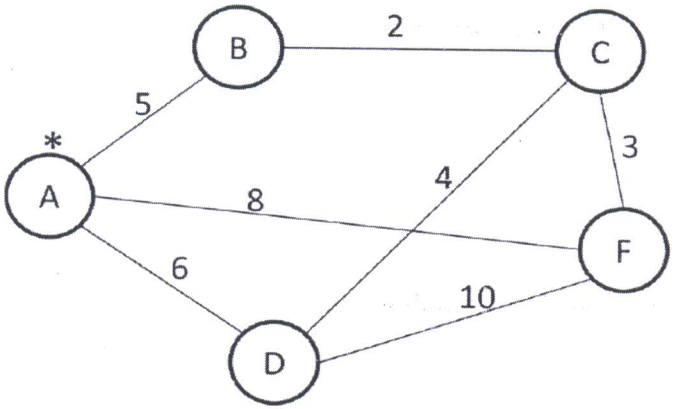
Q11) a) Elaborate graph representation techniques. [04]

b) Explain, how queue can be used for breadth first traversal related to graph traversal? [06]

c) Describe Kruskal's algorithm with example to find minimum spanning tree of a graph. [06]

OR

Q12) a) Find the minimum cost spanning tree from following graph using Prim's algorithm [08]



b) Find shortest path from node A to all nodes in following graph using Dijkstra's algorithm. [08]