

**Bachelor of Computer Applications
Annual Examinations – 2006**

**Paper BCAD –402
Data Structure in C**

Time allowed: Three hours

Maximum Marks: 100

Question no.1 is compulsory. Attempt any 6 questions out of remaining 8 questions. Marks are written in the margin.

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|---|------------|
| Q1. (a) Ackermann's function $A(m, n)$ is defined as follows:
$A(m, n) = n + 1, \text{ if } m = 0$ $= A(m - 1, 1), \text{ if } n = 0$ $= A(m - 1, A(m, n - 1)), \text{ otherwise.}$ <p>Write a recursive procedure to compute this function.</p> | 5 X 8 = 40 |
| (b) What is an array? Explain with the help of suitable example. | |
| (c) Explain the concept of linked list Data structure with the help of suitable example. | |
| (d) Trace the execution of Infix-to-postfix algorithm on the following expression
$3 + \{ 23 \times 9/3 - 67 - (2 \times 7)/9 \}$ | |
| (e) Explain the concept of Queue data structure with the help of suitable example. | |
| (f) Explain the concept of various Tree Traversal techniques with the help of suitable example | |
| (g) Explain the various ways of representing graph in computer memory. | |
| (h) Explain the binary search algorithm by writing its function. | |
| Q2. Explain the shell sort algorithm with the help of suitable example. Write a program in C to implement it. | 10 |
| Q3. Discuss the various methods of traversing a graph with the help of suitable diagram and example | 10 |
| Q4. Explain the followings with the help of suitable diagram and example: | 10 |
| (a) AVL Tree | |
| (b) Multiway search Tree | |
| Q5. Write a program in C for inorder, preorder and postorder traversal of a binary tree. | 10 |

- Q6. Explain pointer based implementation of a queue by writing program. 10
- Q7. Write and explain a program for converting an Infix expression into Postfix expression. 10
- Q8. Explain the following in brief: 10
- (a) ADT
 - (b) Algorithm
 - (c) Circular linked list
 - (d) Row major order
 - (e) Column major order