

17CS/IS33

Third Semester B.E. Degree Examination, July/August 2021 **Data Structures and Applications**

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

Define Data structure, classify them briefly. 1 (05 Marks) What is structure, how it is different from an array, how are they defined and initialized. (05 Marks) Explain with examples about dynamic memory allocation functions. (10 Marks) With example explain about self referential structures. a. (05 Marks) What is pointer variable? How pointers are declared and initialized in C? Can we have multiple pointers to a variable? (05 Marks) Write a C program to Compare two strings i) ii) To concatenate two strings. (10 Marks) Define stack, list the application of stack. Write a C function to insert on element in stack and delete a element from stack. (06 Marks) With suitable example explain infix postfix and prefix expression. (06 Marks)

- (08 Marks) Define Queue, explain the implementation of queue. (06 Marks)
 - State clearly problem of Tower of Hanoi. Write a program to solve this problem for 3 disks using the technique of recursion. (08 Marks)

c. Explain the evaluation of postfix expression 456 *+. Mention the rule for evaluation of

c. Explain the following:

postfix expression.

i) Dequeue ii) Priority Queue.

(06 Marks)

- Define list. Explain the representation of linked list in memory. (05 Marks) b. Explain circular linked list and doubly linked list with example. (10 Marks)
 - c. List out operations performed on list explain any two of them.

(05 Marks)

- Define polynomial, explain the representation of polynomial. Write a C program to add two polynomial. (10 Marks)
 - What is sparse matrix? Write the tripelet form and linked list representation of sparse matrix given in below Fig. Q.6(b) and write the program. (10 Marks)

0 7 0 0 0 2 6 0

Fig.Q.6(b) Sparse Matrix.

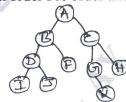
- 7 a. Define the following with example:
 - i) Binary tree
 - ii) Complete binary tree
 - iii) Binary search tree
 - iv) Threaded binary tree. (10 Marks)
 - b. Write C routine for In order Pre order and Post order traversal with example for each.

(10 Marks)

- 8 a. Explain how to
 - i) Insert a node into binary search tree
 - ii) Searching a binary search tree.

(10 Marks)

b. For the tree given below write the In order Pre order and Post order traversal. (06 Marks)



c. Construct a tree for post order traversal 4, 12, 10, 18, 24, 22, 15, 31, 44, 35, 66, 90, 70, 50, 25

(04 Marks)

- 9 a. Define Graph. Explain the matrix and adjacency list representation of a graph with example.
 - b. Explain the following traversal methods:
 - i) Breadth first search
 - ii) Depth first search.

(10 Marks)

Explain Radix sort.

(05 Marks)

- Write a note on:
 - a. File Attributes
 - b. File Organization and Indexing
 - c. Hashing
 - d. Elementary graph operation.

(20 Marks)