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BCA (Semester-II) (NEP) Examination, 2025

DISCIPLINE SPECIFIC COURSE (DSC)

DATA STRUCTURE

Time Allowed : Three Hours

Maximum Marks : 70

Note : This question paper is divided into **two** sections. Attempt questions of **all two** sections as per direction. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **all ten** questions. Each question carries **1** mark. [10×1=10]

1. (i) The worst case time complexity of Bubble sort is :

(a) O (n logn)

(b) O (logn)

(c) O (n^2)

(d) O (n)

(ii) Which type of linked list stores the address of the head node in the next pointer of the last node?

(a) Doubly Linked list

(b) Circular Linked list

(c) Hashed List

(d) Singly linked List

(iii) Suppose the contents of an array A are, A={NULL,2,NULL,8}; What would be the size of the array considering it as a normal array and a sparse array?

(a) 5 and 5

(b) 5 and 2

(c) 2 and 5

(d) 2 and 2

(iv) The result of evaluating the postfix expression :

562 + * 1241 - is :

(a) 40

(b) 35

(c) 32

(d) 37

(v) A Queue is said to be FULL when :

(a) FRONT =1

(b) REAR=N

(c) FRONT = REAR+1

(d) FRONT = REAR-1

(vi) For an AVL tree the balance factor of a node can be either :

(a) 1 or -1

(b) 0,1 or -1

(c) 1, -1 or 2

(d) 0,1 or -2

(vii) Which Data structure is used in implementation of depth first search?

(a) Stack

(b) Queue

(c) Linked list

(d) Tree

(viii) Which algorithm finds the shortest path between all pairs of vertices in a graph with positive or negative edge weights?

(a) Dijkstras' Algorithm

(b) Floyd-Warshall algorithm

(c) bellman-Ford Algorithm

(d) Prims algorithm

(ix) What is the output of Radix sort algorithm applied on given list after the second pass?

348,143,361,423,538,128,321,543 :

(a) 361,321,143,423,543,348,538,128

(b) 361,143,423,321,543,348,128,538

(c) 321,423,128,538,143,543,348,361

(d) 321,423,128,538,348,143,543,361

(x) What is the average case time complexity of Binary search using recursion?

(a) O (logn)

(b) O (n logn)

(c) O (n)

(d) O (n^2)

(Short Answer Type Questions)

Note: Attempt **all five** questions. Each question carries 4 marks.(Word limit : 250 words) : [5×4=20]

2. (i) Explain the classification of Data structure.

(ii) Explain Traverse operation in Doubly Linked List with example.

(iii) Write an algorithm for PUSH and POP operations in stack.

(iv) Write an algorithm for depth first traversal.

(v) Explain working of binary search algorithm with example.

SECTION-B

(Long Ansewer Type Questions)

Note: Attempt **one** question from each unit. Each question out of two carries **10** marks.(Word limit : **500** words) [4×10=40]

UNIT-I

3. Explain Insertion and deletion operations on singly linked list with suitable example.

OR

What is an Array? Explain insertion, deletion and traversing operations performed on 1D-Arrey with algorithm.

UNIT-II

4. Convert the given infix expression to postfix expression using stack and write algorithm for it.

A+B – C * D+(E ∧F) * G|H|I * J+K

OR

Explain different types of Queue and operations performed on Queue.

UNIT-III

5. Write the algorithm for pre-order, post-order and in-order tree traversal techniques and give examples.

OR

Explain Breadth first search and depth first search algorithm.

UNIT-IV

6. Perform Merge-short algorithm on the give in list.

66,32,41,23,54,87,60,10,81,20,50,44

OR

Explain Binary search algorithm with example.

——x——