SANT GADGE BABA AMRVATI UNIVERSITY, AMRAVATI
Summer Examination 2020
HVPM's College of Engineering and Technology, Amravati
Department of Computer Sci. & Engineering
Bachelor of Engineering Sem. :- IV

Subject :- Data Structure (4KS01) **Marks: 20**

Instructions:-

1) **Solve any two questions**
2) **All question carry equal marks**

Q1.

a) Briefly describe the notions of 02

- The complexity of an algorithm
- Time space tradeoff of an algorithm

b) Using the Bubble sort Algorithm, Find the number of Comparisons and the number of interchanges which alphabetize the letters in **PEOPLE** and Show all the intermediate steps in each pass. 02

c) Discuss the advantage of if any, of two way list over one way list for following operation. 02

1) Traversing the list to process each node.
2) Deleting the node whose location LOC is given.

d) Consider the following stack of city names: 02

STACK : London, Berlin, Rome, Paris,____, _____

Describe the stack as the following operation takes place:

1. PUSH(STACK,Athens) **2. POP(STACK, ITEM)**
3. POP(STACK, ITEM) **4. PUSH(STACK,Madrid)**

e) Suppose the following six numbers are inserted in order into an empty binary tree :-

40 , 60 , 50 , 33 , 55 , 11

Draw Binary Search Tree. 01

f)

Suppose 9 cards are punched as follows: 01

348, 143, 361, 423, 538, 128, 321, 543, 366.

Apply Radix sort to sort the numbers in three phases.

Q2.

a) Apply the 'Sieve Method' to find all the prime number less then 30.Show all steps separately and give results. 02

b) Let DATA be the following sorted 13 element array: 02

5 20 30 35 40 45 55 60 65 70 85 80 95

Apply Binary Search to DATA for searching an ITEM=55. Show the steps in applying Binary Search to this array.

c) Discuss the advantage of if any, of two way list over one way list for following operation. 02

1)Searching an unsorted list for a given element ITEM.

2)Searching a sorted list for a given element ITEM

d) Consider the following stack of characters , where STACK is allocated N = 8 memory cells.

STACK: A , C , D , F , K , – , – , –

("_" denotes empty memory cell.)

Describe stack for following operations. 02

1. POP (STACK ,ITEM) 2. POP (STACK ,ITEM) 3. PUSH (STACK , L) 4. PUSH (STACK ,P)

e) Suppose six weights 4, 15, 25, 5, 8, 16 are given .Find a 2-tree T with the given weights & a minimum weighted Path length P. 01

f) Suppose an array A contains 8 elements as follows: 01

77, 33, 44, 11, 88, 22, 66, 55

Apply selection sort to arrange this in ascending order. Show all passes and result.

Q3.

a) Find the table and corresponding graph for second pattern matching 02

Algorithm where p = ababab.

b) Write an algorithm to insert and Delete an element from an array. 02

c) Explain the following 02

1. Garbage collection **2.** Two way list

d) Explain Priority Queue. 02

e) Consider the following algebraic expression. 01

$$E= (2x+y)(5a-b)^3$$

Draw the tree T which corresponds to expression E and find the preorder traversal of tree T.

f) Suppose array A contains 14 elements as follows: 01

66, 33, 40, 22, 55, 88, 60, 11, 80, 20, 50, 44, 77, 30

Apply merge sort algorithm to arrange this list in ascending order. Show all passes and results.

Q4.

a) Consider the pattern p=abc using the slow pattern matching algorithm. Calculate the number of comparisons to find the index P in the following text T. 02

- $(bca)^8$
- $(ab)^{10}$

b) Suppose the following numbers are stored in array 02

32, 51, 27, 85, 66, 23, 13, 57

Apply the Bubble sort Algorithm on numbers to Sort them.

c) Explain the following Conditions 02

1. Overflow 2. Underflow

d) Suppose S is the following list of 12 numbers: 02

44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66

Use Quick sort algorithm to find the final position of the first number 44.Show Steps.

e) Consider the following algebraic expression. 01

$E= (2x+y)(5a-b)^3$

Draw the tree T which corresponds to expression E and find the postorder traversal of tree T.

f) Suppose an array A contains 8 elements as follows: 01

77, 33, 44, 11, 88, 22, 66, 55

Apply insertion sort to arrange this in ascending order. Show all passes and result.