ROLL NO._____

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA
THEORY EXAMINATION

Date of the Examination: 13-05-2019
Semester...2nd .....
Course No.....ITPC-12.....
Number of Questions to be attempted..05
Total No. of Questions.....06.....

Programme:....B.Tech.....
Subject: Data Structures
Maximum Marks...50.....
Time allowed...3 Hours.....
Total No. of Pages used...03....

The candidates, before starting to write the solution, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right **course no**. and **subject title**. Assume suitably and state, additional data required, if any.

Note: Attempt any five questions and marks for every part of question are indicated against of it.

Q1.	a. An array of 10 elements, a[0:9], having values [4, 2, 6, 7, 1, 0, 9, 8, 5, 3] is to be sorted using insertion sort i. Draw a figure to show the progress of the sorting, for the above sequence of input values. ii. Assume that a read operation takes 1 unit of time, while a write operation takes 2 units of time. What is the amount of time taken to complete the sorting? Explain your reasoning used to compute the time taken. Also, explicitly mention any other assumptions that you may need. b. WAP in C language to find the last occurrence of a word in a given string.	3+4 3
Q2.	a. Consider the following arithmetic expression P, written in Postfix notation. Translate P, into its equivalent Infix Expression; evaluate the infix expression using algorithm. P: 12,7,3,-,/,2,1,5,+,*,+ b. A stack of INT is implemented using an array as the following data type: #define SIZE 20 typedefstruct { int data[SIZE]; int top; } Stack; Fill up the missing codes in the PUSH, POP, and TOP operations of the Stack.	4 2

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	c. Write an algorithm to find whether a particular element is present or not in circular queue. What is the advantage of circular queue over a simple queue?	4

Q3.	a. What is the output of the following program? Explain it
	#include<stdio.h>
	void f(int *p, int *q)
	{
	p = q;
	*p = 2;
	}
	int i = 0, j = 1;
	int main()
	{
	f(&i, &j);
	printf("%d %d n", i, j);
	getchar();
	return 0;
	}
		2

	b. Assume that float takes 4 bytes, predict the output of following program and explain it.
	#include <stdio.h>
	int main()
	{
	float arr[5] = {12.5, 10.0, 13.5, 90.5, 0.5};
	float *ptr1 = &arr[0];
	float *ptr2 = ptr1 + 3;
	
	printf("%f ", *ptr2);
	printf("%d", ptr2 - ptr1);
	
	return 0;
	}
		2

	c. The elements 32, 15, 20, 30, 12, 25, 16, 8, 10, 31 are inserted one by one in the given order into a Max Heap. What will be the resultant Max Heap and the number of exchanges and also write down the algorithm for Heapify () and Build_Heap()?	6
Q4.	a. WAP in C program function to reverse every group of k nodes in a given double linked list.	5
	b. WAP in C program to add two polynomial using: i. Degree based representation ii. Exp, coef based representation	2.5+2.5

Q5.	a. Build a Huffman Tree from the following frequency table:	5

A	B	C	D	E	F	G	H
.20	.04	.07	.11	.32	.06	.05	.15

	b. Show the binary search tree that is obtained from after inserting the key 8,11,5,7,9,6,10,14,12. Redraw the tree after deleting the root.	5
Q6.	a. Construct the Binary Tree using following Tree Traversal algorithms: **In-order:** 9, 8, 4, 2, 10, 5, 10, 1, 6, 3, 13, 12, 7 **Pre-order:** 1, 2, 4, 8, 9, 5, 10, 10, 3, 6, 7, 12, 13	3
	b. WAP in C language to convert the content of File to Uppercase.	3
	c. WAP in C language to find the size of a Binary Tree.	4