

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program : B.Tech(CSE)-All IBM courses

Semester – : II

Subject (Course):Advanced Data Structures

Max. Marks :

100

Course Code :CSEG1004

Duration : 3

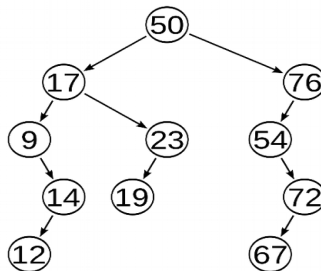
Hrs

No. of page/s :02

Note: Answer the following questions

Section - A

1. Explain call by reference and call by value with C++ program. 5 Marks
2. Write a C++ program for calculating the area of rectangle and circle using run time polymorphism 5 Marks
3. Represent the following tree using array and single linked list. 5 Marks



4. Write a C++ program to represent weighted graph in computer memory using linked list. 5 Marks

Section - B

5. What is heap tree? arrange the following data in ascending order using heap sort: **H E A P S O R T** 10 Marks

OR

What is the ambiguity that arises in multiple inheritance? How it can be overcome. Explain with example.

6. Explain the role of seekg(),seekp(), tellg(), tellp(), function in the process of random access in a binary file. 10Marks
7. What is the benefit of copy constructor? Explain the necessity of defining your own copy constructor?. 10 Marks

8. Define an AVL tree. Obtain an AVL tree by inserting one integer at a time in the following sequence. And show all the steps
150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180. 10 Marks

Section - C

- 9A. Write a C++ program to implement the following equation and find the value of $C(7,4)$ 10 Marks

$$C(n, k) = \begin{cases} 1, & \text{if } k=0 \vee k=n \\ C(n-1, k-1) + C(n-1, k), & \text{for } n > k > 0 \end{cases}$$

- 9B. Construct the binary search tree using the following order. 10 Marks

In order: 9,12,14,17,19,23,50,54,67,72,76

Preorder: 50,17,9,14,12,23,19,76,54,72,67

OR

Define a class Date, use overloaded + operator to add two dates and display the result. Assume non leap year dates.

- 10A. Write a C++ program to add the following expression using oops concepts 10 Marks

$$p_1(x) = a_0x^0 + a_1x^1 + a_2x^2 + \dots + a_{n-1}x^{n-1}$$

$$p_2(x) = b_0x^0 + b_1x^1 + b_2x^2 + \dots + b_{n-1}x^{n-1}$$

- 10B. Find the binary tree for the following graph using DFS method starting from node C and show the stack content in each step. 10 Marks

Nodes	A	B	C	D	E	F
A	0	0	1	1	1	1
B	1	0	1	1	1	1
C	1	0	0	1	1	1
D	1	1	1	0	1	1
E	1	1	0	1	0	1
F	1	0	1	1	1	0

Roll No: -----



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018

Program	: B.Tech(CSE)-All IBM courses	Semester –	: II
Subject (Course):	Advanced Data Structures	Max. Marks	: 100
Course Code	: CSEG1004	Duration	: 3 Hrs
No. of page/s	: 02		

Note: Answer the following questions

Section - A

- 1 Write a C++ program to represent weighted graph in computer memory using linked list. 5 Marks
- 2 What are the differences between object oriented programming and structure oriented programming 5 Marks
- 3 What is the meaning of height balanced tree? How rebalancing is done in height balanced tree. 5 Marks
- 4 What is a constructor? Explain the different types of constructor with an examples 5 Marks

Section - B

- 5 What is an inheritance? Explain hybrid inheritance with program 10 Marks
- 6 Explain heap structures. How are binary heaps implemented? Give its algorithm with an example. 10 Marks
- 7 What is m-way tree? Construct 2-3 tree for the following data; DATA STRUCTURE 10 Marks

OR

Construct an AVL tree for the following data: 9,7,6,12,15,18,3,9,11 , 21,1

- 8 Write a C++ program that reads character from the keyboard one by one. All lower case characters get store inside the file *lower.txt*, all upper case characters get stored inside the file *upper.txt* and all other characters get stored inside *others.txt*. 10 Marks

Section - C

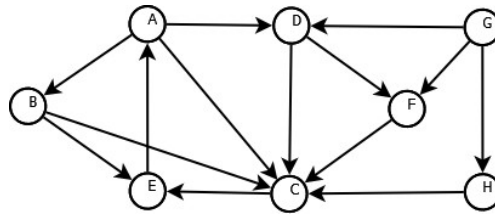
- 9A What is a binary search tree? Write C++ function to delete a root node from binary tree. 10 Marks

OR

Write a C++ program to evaluate the following expression.

$$\sum (x) = \frac{x}{1!} - \frac{x^2}{2!} + \dots - \frac{x^n}{n!}$$

- 9B Find the BFS and DFS tree for the following graph starting from node C 10 Marks



- 10 What is a recursion? Write a C++ recursive program to find the minimum of N integer numbers. 10 Marks
- 10B What is a tree? Explain the following tree terminologies with an example Root node, height, level, leaf, child 10 Marks