

**APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER**

Q. P. Code : CS-1B-18-2

(Pages: 3)

Name:

Reg. No:.....

FIRST SEMESTER M.TECH. DEGREE EXAMINATION DEC 2018

Branch: Computer Science and Engineering Specialization: Computer Science and Engineering

08 CS 6021 ADVANCED DATA STRUCTURES

Time:3 hours

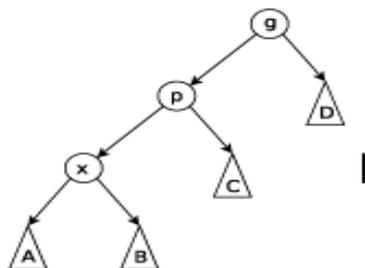
Max.marks: 60

Answer all six questions.

Modules 1 to 6:Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	Is the array with values { 21, 15, 18, 8, 12, 11, 16, 4, 9 } a max-heap? Justify	3
	Answer b or c	
b	Explain the importance of asymptotic notations during analysis of algorithms. Explain all asyrnptotic notations with proper definitions and diagrams.	6
c	Construct a MAX HEAP using suitable pseudo code for MAX-HEAPIFY() and BUILDMAXHEAP() with the values 4,1,3,2,16,9,10,14,8,7	6

Q.no.	Module 2	Marks
2.a	Explain the splaying operations Zig Zig on splay tree with the following diagram	3



Answer b or c

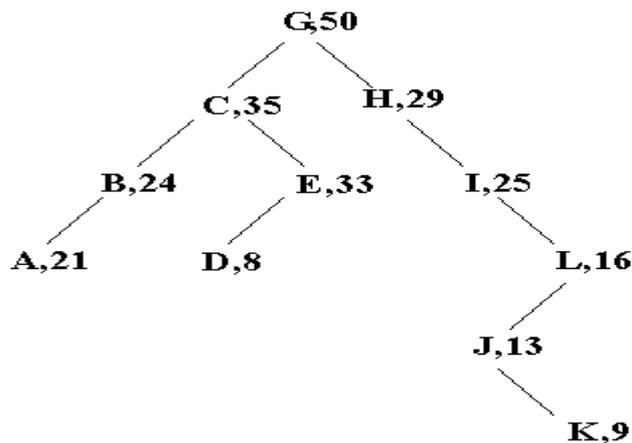
- b** Define an M-way tree. Start with an empty B-tree and keys arrive in the following order: 1 12 8 2 25 5 14 28 17 7 52 16 48 68 3 26 29 53 55 45. Construct a B-tree of order 5 **6**
- c** Illustrate Insertion operation of the following elements 2,1,4,5,9 in the same order to an empty Red Black Tree **6**

Q.no. Module 3 Marks

- 3.a** The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \text{ mod } 10$ and linear probing. What is the resultant hash table? **3**

Answer b or c

- b** Insert the (key,priority) pair (F,40) in this treap **6**



- c** Explain the different methods of amortized analysis in detail in terms of stack operations. **6**

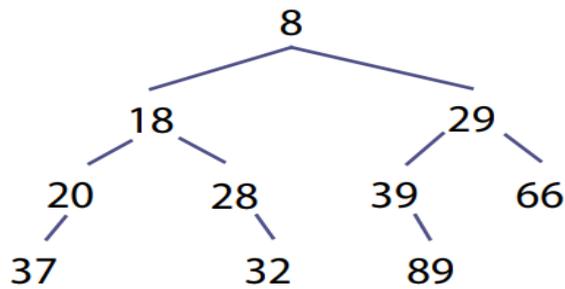
Q.no. Module 4 Marks

- 4.a** Explain the basic operations and working of Priority Queue. **3**

Answer b or c

b Illustrate DeleteMin operation on the following Skew heap

6



c Define Leftist heap as an abstract data type. Develop algorithms for the operations on leftist heap.

6

Q.no. **Module 5** **Marks**

5.a Compare the properties of Fibonacci heap and binomial heap.

4

Answer b or c

b Write an implementation of Dijkstra's algorithm for single source shortest using Fibonacci heap. Analyse your algorithm?

8

c Analyze and justify why a Fibonacci heap can be considered as a better structure than arrays and binary heaps for implementing Dijkstra's algorithm

8

Q.no. **Module 6** **Marks**

6.a Suggest applications of Quad Tree structure

4

Answer b or c

b Develop algorithm to Insert the following elements in sequence (3, 6), (17, 15), (13, 15), (6, 12), (9, 1), (2, 7), (10, 19) to a 2-D tree

8

c Write applications of MX-Quad Tree and point quad tree.

8