

**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.

<b>Q.no.</b>	<b>Module 1</b>	<b>Marks</b>
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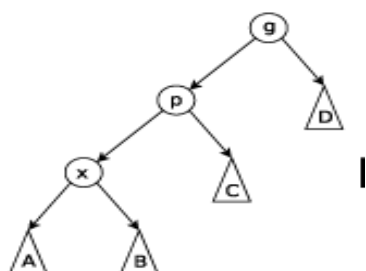
<b>1.a</b>	Is the array with values { 21, 15, 18, 8, 12, 11, 16, 4, 9 } a max-heap? Justify	<b>3</b>
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**Answer b or c**

- |          |   |          |
|----------|---|----------|
| <b>b</b> | Explain the importance of asymptotic notations during analysis of algorithms.<br>Explain all asyrynptotic notations with proper definitions and diagrams. | <b>6</b> |
| <b>c</b> | Construct a MAX HEAP using suitable pseudo code for MAX-HEAPIFY( )<br>and BUILDMAXHEAP( ) with the values 4,1,3,2,16,9,10,14,8,7                          | <b>6</b> |

<b>Q.no.</b>	<b>Module 2</b>	<b>Marks</b>
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<b>2.a</b>	Explain the splaying operations Zig Zig on splay tree with the following diagram	<b>3</b>
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**Answer b or c**

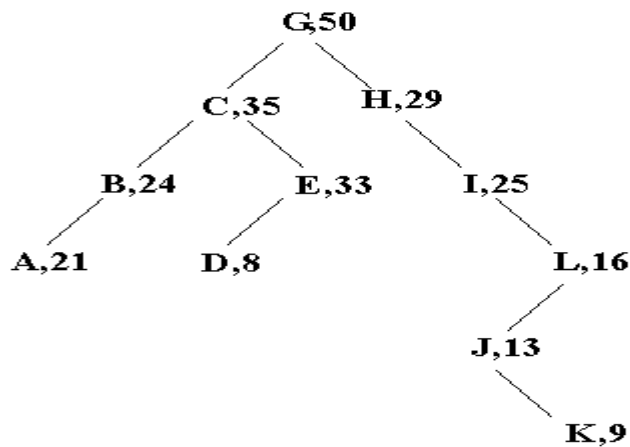
- b** Define an M-way tree. Start with an empty B-tree and keys arrive in the following order: 1 12 8 2 25 5 14 28 17 7 52 16 48 68 3 26 29 53 55 45. Construct a B-tree of order 5 **6**
- c** Illustrate Insertion operation of the following elements 2,1,4,5,9 in the same order to an empty Red Black Tree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

<b>Q.no.</b>	<b>Module 3</b>	<b>Marks</b>
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- 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  $h(k) = k \bmod 10$  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**

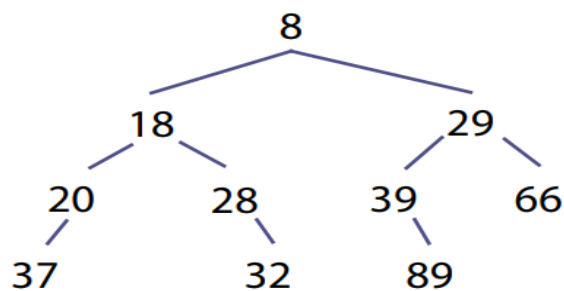
<b>Q.no.</b>	<b>Module 4</b>	<b>Marks</b>
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- 4.a** Explain the basic operations and working of Priority Queue. **3**

**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

<b>Q.no.</b>	<b>Module 5</b>	<b>Marks</b>
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5.a	Compare the properties of Fibonacci heap and binomial heap.	4
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**Answer b or c**

b	Write an implementation of Dijkstra's algorithm for single source shortest using Fibonacci heap. Analyse your algorithm?	8
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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
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<b>Q.no.</b>	<b>Module 6</b>	<b>Marks</b>
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6.a	Suggest applications of Quad Tree structure	4
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**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
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c	Write applications of MX-Quad Tree and point quad tree.	8
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