

**GUJARAT TECHNOLOGICAL UNIVERSITY**

M.E Sem-I Examination January 2010

Subject code: 710201

Subject Name: Computer Algorithm

Date: 20 / 01 / 2010

Time: 12.00 – 2.30 pm

Total Marks: 60

**Instructions:**

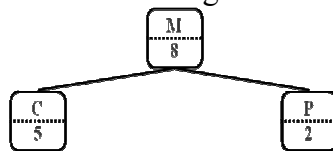
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Find out complexity of **06**  
 $T(n) = 3T(n/2) + n^2$ ,  
 $T(n) = 16T(n/4) + n$ , using master method in terms of  $O$  (Big Oh)
- (b) Explain worst case and Best case complexity of INSERTION sort. **06**

- Q.2** (a) Difference between red-black tree and AVL tree. (In terms of application) **06**  
with example.
- (b) If 48 bit word is given for RADIX sort with  $r=24$ , How many maximum **06**  
passes would be required for Radix sort to sort approximately 3000 nos.  
Prove your answer. How many passes would be required for Merge sort in  
above case?

**OR**

- (b) Create AVL tree for following sequence of insertion **06**  
Jan, Feb, ... Dec
- Q.3** (a) Explain the utilization of augmented data structure with Information and **06**  
Rank in below given example.



- (b) Generate equation for chain Matrix multiplication using Dynamic **06**  
programming and find out minimum no of multiplication required for  
multiplying:  $A [50 \times 10]$ ,  $B [10 \times 89]$  and  $C [89 \times 15]$ .

**OR**

- Q.3** (a) For a graph  $G = (V, E)$  with  $V$  no of Vertices and  $E$  no of Edges. Where  $V=12$  **06**  
and  $E=23$ . What kind of storage would be used to store Information of Adjacent  
Nodes? What would be storage requirement/complexity for maintaining  
information for adjacent List and adjacent Matrix?
- (b) Explain different types of Edges in DFS with suitable example. **06**

- Q.4** (a) Explain Prim's algorithm with time and space complexity. **06**
- (b) Describe a naive algorithm for solving the Hamiltonian-cycle problem with **06**  
running time complexity?

**OR**

- Q.4** (a) Explain how Parallel algorithms differ to Sequential algorithms. Write Parallel **06**  
algorithms and Sequential algorithms algorithm to sum  $n$  no's.

- (b) 1) Parallel radix sort algorithm **06**  
A) Extend the parallel radix sort algorithm where the number  $n$  of elements to be sorted is larger than the number  $p$  of processors.
- Q.5** (a) Compare and contrast Binomial Heap and Fibonacci Heap. Explain procedure of merging two Binomial Heaps. **06**  
(b) Explain data structure of a Fibonacci Heap using suitable example. **06**
- OR**
- Q.5** (a) How Disjoint Set Forest can be implemented? Provide related algorithm. **06**  
(b) Write an algorithm to delete a key from B-tree. Trace your algorithm on suitable example. **06**

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