



**P.E.S. College of Engineering, Mandya - 571 401**

*(An Autonomous Institution affiliated to VTU, Belgaum)*

**First Semester, M. Tech - Computer Engineering (MCEN)**

**Semester End Examination; Jan - 2017**

**Advanced Algorithms**

*Time: 3 hrs*

*Max. Marks: 100*

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

**UNIT - I**

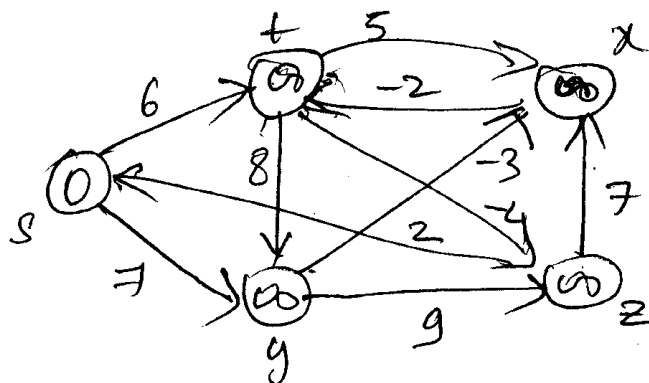
- 1 a. Which are the asymptotic notations used for representing growth functions? Give their definitions. 8
- b. Discuss the standard notations and the illustrations of the mathematical derivations for exponential and logarithmic functions. 12
- 2 a. Obtain the recursion tree for the recurrence and correlate the growth function derived with that of substitution method, 12  

$$T(n) = T(n/3) + T(2n/3) + Cn.$$
- b. Define and obtain the derivations of Master's method. Using the same obtain the growth function for the given recurrence, 8  

$$T(n) = 3T(n/4) + n \log n.$$

**UNIT - II**

- 3 a. Briefly discuss the dynamic programming steps involved in optimally parenthesize the matrix chain. 12
- b. With the help of an exponential time recursive algorithm, discuss the steps involved in computing the length of an LCS of two sequences. 8
- 4 a. What are the three methods of amortised analysis? Discuss any two in detail. 10
- b. Write an algorithm for Bellman-Ford shortest path technique and obtain the same for the given graph.



10

**UNIT - III**

- 5 a. List out the advantages of dynamic multi threading. 5
- b. What are the performance measures used for finding the efficiency of dynamic multi threading? 7
- c. With the help of a theorem, prove the correctness of RSA cryptosystem. 8
- 6 a. With the help of an algorithm, discuss the working and efficiency of the divide and conquer multi threaded algorithm for matrix multiplication. 12
- b. Discuss the working of Miller-Robin primality testing algorithm. 8

**UNIT - IV**

- 7 a. With example, discuss the working of Robin-Karp string matching algorithm. 6
- b. Compare the FSA string matcher with KMP string matcher. 6
- c. With example illustrations, prove that the problem of circuit satisfiability is NP-hard. 8
- 8 a. With the help of algorithm, discuss the working of KMP string matching algorithm. 10
- b. With graphical illustrations, prove that the dique problem is NP-complete. 10

**UNIT - V**

- 9 a. With the help of algorithm, discuss the working of Monte-Carlo algorithm of testing polynomial equality. 10
- b. Write an algorithm for matrix vector multiplication using shared memory model. Discuss the method in detail. 10
- 10 a. Discuss the working of Randomizing quick sort. Illustrate it with an example. 5
- b. Explain the following :
- i) Hyper cube 15
- ii) Performance of parallel algorithm.

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