

**6E3016**

Roll No. \_\_\_\_\_

Total No of Pages: **4****6E3016****B. Tech. VI Sem. (Old Back) Exam., May/June-2014****Computer & IT****6IT3 Design & Analysis of Algorithms****(Common with 6CS3)****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:-**

*Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

*Units of quantities used/ calculated must be stated clearly.*

*Use of following supporting material is permitted during examination.*

1. \_\_\_\_\_

2. \_\_\_\_\_

### UNIT-I

Q.1 Part (a) Solve the following recurrence

$$T(n) = 7T\left(\frac{n}{2}\right) + 3n^2$$

Where n is a power of 2 and is greater than 1. [8]

Part (b) Write the algorithm for merge sort using divide and conquer method. [8]

**OR**

Q.1 Part (a) Show the Strassen's multiplication for the following matrices - [8]

$$A = \begin{bmatrix} 7 & 9 \\ 2 & 5 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 3 & 2 \\ 6 & 5 \end{bmatrix}$$

Part (b) Explain greedy method for job sequencing using a suitable example. [8]

**UNIT-II**

Q.2 Part (a) Explain backtracking with the help of an algorithm. [8]

Part (b) Generate a state space tree for the following cost matrix: [8]

$$C_{ij} = \begin{array}{c} \begin{array}{cccc} & A & B & C & D \\ A & \infty & 10 & 5 & 3 \\ B & 8 & \infty & 9 & 7 \\ C & 1 & 6 & \infty & 9 \\ D & 2 & 3 & 8 & \infty \end{array} \end{array}$$

Use Branch and bound method.

**OR**

Q.2 Part (a) What is dynamic programming? Discuss the elements of dynamic programming. [8]

Part (b) Perform the Travelling salesman problem on the given matrix: [8]

$$\begin{array}{c} \begin{array}{cccc} & A & B & C & D \\ A & \infty & 3 & 4 & 2 \\ B & 5 & \infty & 3 & 6 \\ C & 6 & 4 & \infty & 7 \\ D & 4 & 7 & 5 & \infty \end{array} \end{array}$$

### UNIT-III

- Q.3 Part (a) Explain the KMP matcher algorithm. [8]  
Part (b) Describe Naïve and Rabin Karp string matching algorithm. [8]

### OR

- Q.3 Part (a) Explain Quadratic assignment problem using a suitable example. [8]  
Part (b) Describe Boyer Moore algorithm of string matching. [8]

### UNIT-IV

- Q.4 Part (a) What do you mean by randomized algorithms. Explain the types of randomized algorithms using suitable examples. [8]  
Part (b) Explain randomized algorithm for Min cut. [8]

### OR

- Q.4 Part (a) Explain the following:-  
1. Residual Network.  
2. Augmenting path  
3. Max flow min cut theorem [4x3=12]  
Part (b) What is Network Capacity assignment problem? [4]

## **UNIT-V**

- Q.5 Part (a) Explain an approximation algorithm for vertex cover problem. [8]
- Part (b) What are P and NP class problems? Differentiate between NP complete and NP hard problems. [8]

### **OR**

- Q.5 Part (a) Explain an approximation algorithm for set cover problem. [8]
- Part (b) Show that the Hamiltonian cycle problem is NP-Complete. [8]

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