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**SUBJECT CODE NO:- E-31**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**T.E.(CSE/IT) Examination Nov/Dec 2017**  
**Design & Analysis of Algorithms**  
**(REVISED)**

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Q.1. & Q. 6 are compulsory.
- ii) Solve any two Questions from the remaining each section.

**Section A**

- |     |   |          |
|-----|---|----------|
| Q.1 | Solve any five questions:<br>a) Write characteristics of an algorithm.<br>b) How is algorithm time efficiency measured?<br>c) Define feasible and optimal solution.<br>d) Define asymptotic notation.<br>e) Explain space complexity<br>f) Write any two characteristics of greedy algorithm. | 10       |
| Q.2 | a) Explain binary search method using divide & conquer technique.<br>b) Explain linear search method and compute its best, worst and average space time complexity.   | 08<br>07 |
| Q.3 | a) Explain heap sort with an example.<br>b) Sort the given data using Quick sort : 35, 20, 25, 30, 15, 10, 40, 45   | 08<br>07 |
| Q.4 | a) Find optimal merge patterns for ten files whose lengths are :<br>{28, 32, 12, 5, 84, 53, 91, 35, 3, 11}<br>b) Explain matrix multiplication using divide & conquer.  | 08<br>07 |
| Q.5 | a) Explain Huffman coding with suitable example.<br>b) Explain job sequencing with deadlines by taking suitable example.  | 08<br>07 |

2017

Section B

- Q.6 Solve any five questions: 10
- Define multistage graph.
  - Define implicit & explain constraints.
  - What is least cost search?
  - State any two differences between dynamic & back tracking.
  - Define chromatic number of a graph.
  - What is branch & bound method.
- Q.7 a) Determine optimal binary search tree for [END, GOTO, PRINT, STOP] with given 10  
 probabilities as  $P(1:4) = (3,3,1,1)$   
 $Q(0:4) = (2,3,1,1,1)$
- b) Explain biconnected component of a graph with example. 05
- Q.8 a) Solve 4-Queries problem using backtracking method. 08
- b) Write algorithm for single source shortest path. 07
- Q.9 a) Find Hamiltonian cycle using backtracking for the given cost materials. 08
- |          |          |          |          |
|----------|----------|----------|----------|
| $\infty$ | 10       | 15       | 20       |
| 5        | $\infty$ | 9        | 10       |
| 6        | 13       | $\infty$ | 12       |
| 8        | 8        | 9        | $\infty$ |
- c) Write algorithm for tree traversals. 07
- Q.10 a) Solve 15-puzzle problem using branch & bound. Initial arrangement is: 09
- |    |    |    |    |
|----|----|----|----|
| 1  | 2  | 3  | 4  |
| 5  | 6  | 7  | 8  |
| 9  | 10 | 11 | 12 |
| 13 | 14 | 15 | 12 |
- b) Explain graph coloring problem and its application. 06