

Code: IT5T2

**III B.Tech - I Semester – Regular/Supplementary Examinations
October - 2019**

**DESIGN METHODS AND ANALYSIS OF ALGORITHMS
(INFORMATION TECHNOLOGY)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) What is an algorithm? Explain with an example.
- b) Define the time complexity and space complexity of an algorithm.
- c) Define knapsack problem.
- d) What is called brute force approach? Write its advantages.
- e) Compare divide-and-conquer and decrease-and-conquer techniques.
- f) Discuss heap sort.
- g) State Floyd's algorithm.
- h) Discuss Dijkstra's algorithm.
- i) Draw the decision tree for searching a three-element sorted list by sequential search.
- j) Define NP- complete problem.
- k) Define Hamiltonian circuit problem.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Discuss in detail about various asymptotic notations used to represent the algorithm efficiency with examples. 8 M

b) List the following functions according to their order of growth from lowest to highest.

$(n-2)!$, $5 \lg(n+100)^{10}$, 2^{2n} , $0.001 n^4+3n^3+1$, $3\sqrt{n}$, $\ln^2 n$ 8 M

3. a) Illustrate the selection sort with an example. 8 M

b) Illustrate the assignment problem using exhaustive search technique with suitable example. 8 M

4. a) How to perform Strassen's matrix multiplication using divide- and-conquer technique. 8 M

b) Explain the source –removal algorithm for the topological sorting with suitable example. 8 M

5. a) Test Kruskal's algorithm with suitable example. 8 M

b) Compare greedy method and dynamic programming technique. 8 M

6. a) What is called backtracking? Write the N-queen's algorithm and illustrate with an algorithm. 8 M

b) Draw the state space tree for the following knapsack problem. 8 M

$(w_1, w_2, w_3, w_4) = (4, 7, 8, 3)$; $(v_1, v_2, v_3, v_4) = (40, 42, 25, 12)$;

$W=10$