

Total No. of Questions : 10]

SEAT No. :

P3642

[5560]-598

[Total No. of Pages : 3

T.E. (Information Technology)
DESIGN AND ANALYSIS OF ALGORITHMS
(2015 Course) (Semester - II)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

Q1) a) Compare the following complexities and Reorder from the smallest to the largest. Justify your answer. **[5]**

i) n^2 , 2^n , $n \log_2 n$, $\log_2 n$, n^3 .

ii) $n \log_2 n$, n^8 , $n^2/\log_2 n$, $(n^2 - n + 1)$.

b) Solve Homogeneous Recurrence relation for Fibonacci sequence. **[5]**

OR

Q2) a) Discuss a general plan for Analysing Time Efficiency of Recursive Algorithm. **[5]**

b) Solve the following instance of job sequencing problem using greedy approach. Let $n = 4$, profit $(1 : 4) = (100, 10, 15, 27)$ and deadlines $d(1 : 4) = (2, 1, 2, 1)$. **[5]**

Q3) a) Write an algorithm for Quick sort and analyse it with respect to worst, best and average case. **[5]**

b) Compare the following **[5]**

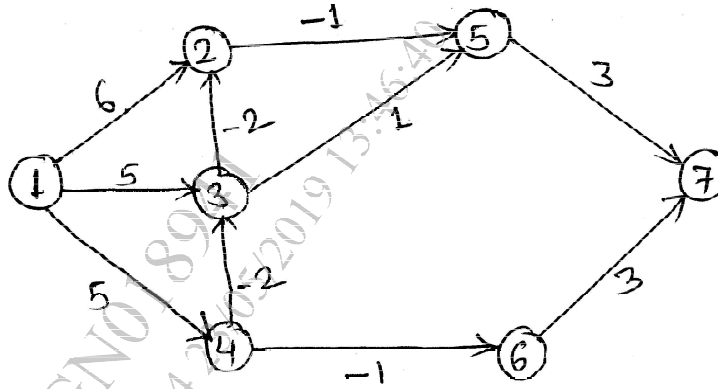
i) Divide and Conquer and Dynamic Programming.

ii) Greedy method and Dynamic Programming.

OR

P.T.O.

Q4) Use Bellman ford algorithm to find shortest path for the following graph.[10]



Q5) a) Write an algorithm to find Hamiltonian path using backtracking method. [8]

b) State the principal of backtracking and Write backtracking algorithm for N-Queen problem. [8]

OR

Q6) a) Let $W = \{5, 7, 10, 12, 15, 18, 20\}$ and $M = 35$. Find all possible subsets of W that sum to M . Construct the portion of state space tree. [8]

b) Write an algorithm for 0/1 knapsack problem using backtracking method. [8]

Q7) Construct the solution of following Travelling Salesperson problem using Branch and Bound. [18]

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

OR

Q8) a) Solve the following instance of 0/1 knapsack problem by FIFO branch and bound approach. [10]

$N = 4, (p_1, p_2, p_3, p_4) = (10, 10, 12, 18)$

$(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ and $M = 15$.

b) Write an algorithm for Least Cost (LC) branch and bound. [8]

- Q9)** a) Explain in detail models for Parallel Computing. [8]
b) Differentiate between : [8]
i) P class and NP Class.
ii) NP complete and NP Hard.

OR

- Q10)** a) Prove that Satisfiability problem is NP complete. [8]
b) Explain Nondeterministic algorithm? Write the Nondeterministic algorithm for searching the element of an array. [8]

