

Total No. of Questions :6]

SEAT No. :

P107

APR. -16/TE/Insem. - 44

[Total No. of Pages :2

T.E. (Information Technology)

DESIGN AND ANALYSIS OF ALGORITHMS

(2012 Pattern) (314449) (Semester - II)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

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

Q1) Reorder the following complexities from the smallest to the largest. [10]

- a) $n \log_2 n$, $n+n^2 + n^3$, 2^4 , $\text{sqrt}(n)$
- b) n^2 , 2^n , $n \log_2 n$, $\log_2 n$, n^3
- c) $n \log_2 n$, n^8 , $n^2/\log_2 n$, $(n^2 - n + 1)$
- d) $n!$, 2^n , $(n+1)!$, 2^{2n} , n^n , $n^{\log n}$

OR

Q2) a) Prove by mathematical induction: "Tiling problem can always be solved". [6]

b) Explain in brief Aggregate analysis technique used in Amortized analysis. [4]

Q3) Analyze Kruskal's algorithm of minimum cost spanning tree using greedy approach find out minimum cost spanning tree using Kruskal's algorithm for given graph. [10]

Edge	Cost		Edge	Cost
(a,b)	3		(c,d)	6
(a,f)	5		(c,f)	4
(a,e)	6		(f,d)	5
(b,c)	1		(f,e)	2
(b,f)	4		(e,d)	8

OR

P.T.O.

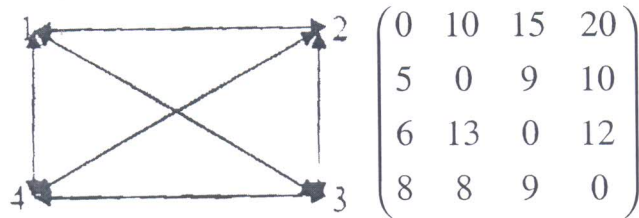
Q4) a) Solve the following instance of job sequencing problem using greedy approach. Let $n = 6$, profit $p(1:6) = (30, 20, 15, 10, 5, 1)$ and deadlines $d(1:6) = (4, 2, 2, 1, 4, 3)$. [6]

b) Analyze the time complexity of Strassen's matrix multiplication using divide and conquer strategy. [4]

Q5) $N=4$ and $(a_1, a_2, a_3, a_4) = (\text{DAA}, \text{ITPM}, \text{OS}, \text{SP})$. Let $p(1:4) = (3, 3, 1, 1)$ and $q(0:4) = (2, 3, 1, 1, 1)$. Compute & construct OBST for above value using dynamic programming. [10]

OR

Q6) a) Find the solution of the following travelling sales person problem using Dynamic approach. [6]



b) Compare dynamic programming with greedy approach. [4]

