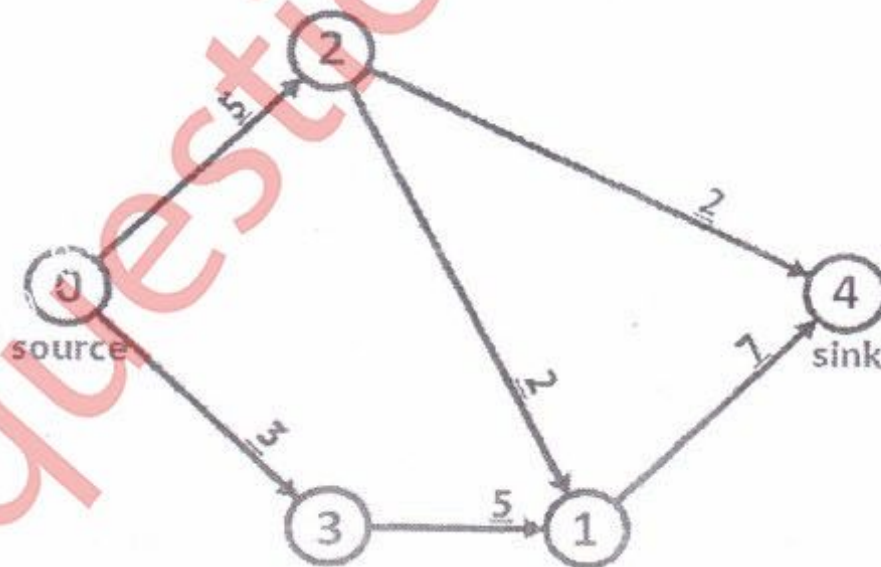


- N.B (1) Question no. 1 is compulsory.
(2) Attempt any 3 from the remaining questions.
(3) Assume suitable data if necessary.
(4) Figures to right indicate full marks.

- 1 (a) Explain different Asymptotic notations and all cases of Master method. Solve 10
following Recurrences using Master Method.
- 1) $T(n) = 2T(n/2) + n^3$
 - 2) $T(n) = 3T(n/4) + n \log_2 n$
 - 3) $T(n) = 2T(n/2) + n/\log n$
 - 4) $T(n) = 16T(n/4) + n!$
 - 5) $T(n) = 0.5T(n/2) + 1/n$
- 1 (b) Explain Johnson's all pair shortest path algorithm with example. 10
- 2 (a) What is binomial heap? Explain it's properties. Explain the operations that can be 12
carried out on binomial heap with example
- 2 (b) Explain Graham's algorithm to find convex hull. 8
- 3 (a) What is red-black tree? Show the red-black tree that results from the successive 10
insertion of the following keys 9,8,7,3,5,2 and the successive deletion of the
following keys 2,5,3,7,8,9
- 3 (b) Find the maximum flow using Ford Flukerson Algorithm. 10



TURN OVER

- 4 (a) Explain Cutting Rod problem. Given a table of prices p_i determine the maximum revenue r_n obtainable by cutting the rod. 8

Len	1	2	3	4	5	6	7	8
Price	1	5	8	9	10	17	17	20

- 4 (b) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 30, 35, 15, 5, 10, 20, 25 \rangle$ 12

- 5 (a) Solve the following linear program using simplex method. 12

Maximize $5x_1 + 3x_2$
Subject to the condition
 $x_1 + x_2 \leq 2$
 $5x_1 + 2x_2 \leq 10$
 $3x_1 + 8x_2 \leq 12$
 $x_1, x_2 \geq 0$

- 5 (b) Explain Closest Pair of Points using divide and conquer. 8

- 6 (a) Explain maximum bipartite matching with an example 10

- 6 (b) Explain insertion and deletion in B- tree with an example. 10

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