

Con. 5450-07.

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(2)

BB-7522

(3 Hours)

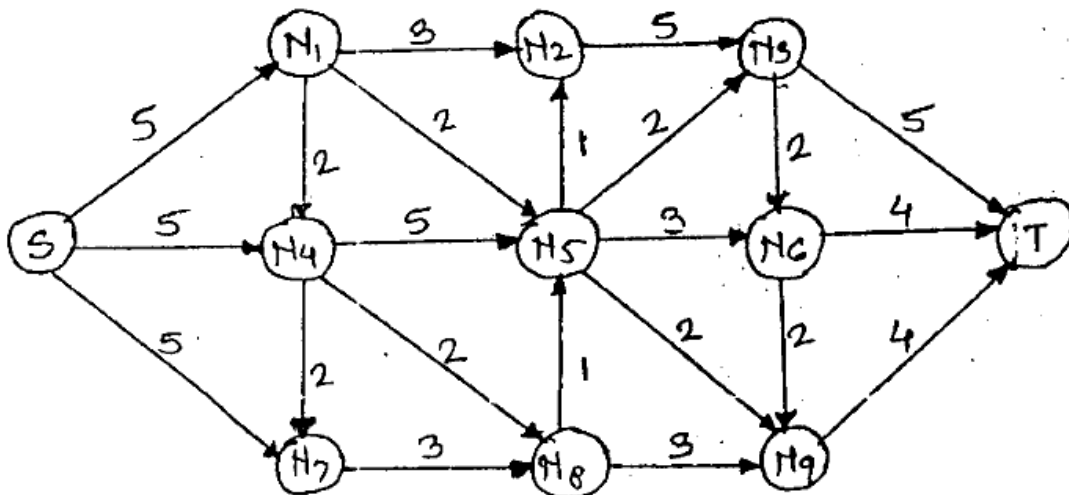
[Total Marks : 100]

N.B. : (1) Questions No. 1 is compulsory.

(2) Answer any four questions out of remaining six questions.

1. (a) What is difference between dynamic and Greedy approach ? Explain manufacturing problem. 10
- (b) Explain RB-Tree insertion algorithm with all cases. 10
2. (a) Prove Vertex-Cover problem is NP-Complete. 10
- (b) Find a feasible solution for following :- 10

$x_1 - x_2 \leq 15$	$x_2 - x_3 \leq 10$
$x_3 - x_4 \leq -10$	$x_4 - x_6 \leq 10$
$x_4 - x_5 \leq -45$	$x_5 - x_6 \leq 55$
$x_1 - x_6 \leq 20$	$x_4 - x_2 \leq 4$
3. (a) Define Co-NP problems. State a Co-NP problem and prove its class membership. 10
- (b) Evaluate the maximum flow from node S to node T (Edge represents capacity between nodes) 10



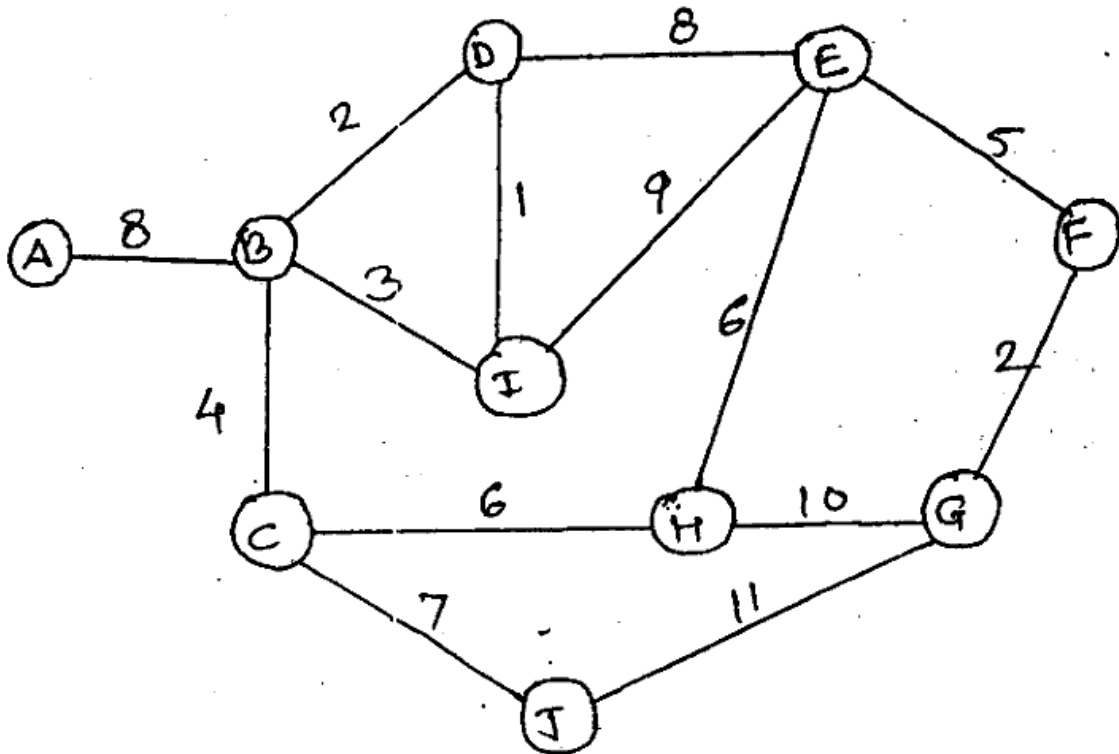
4. (a) Insert following keys in a hash-table of length 11. Show collision resolution results using linear probing and quadratic probing with values $C_1 = 1$ and $C_2 = 3$. 10
Keys : 7, 10, 0, 3, 28, -5, 48, 99, 23, 33, 112
- (b) Generate variable length Huffman Code for following set of frequencies 10
a : 20, b : 10, c : 15, d : 5, e : 22, f : 3.

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5. (a) Compute minimum spanning tree for following graph using prims algorithm.



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- (b) Prove 3-colorability is NP-Complete.
6. (a) Solve the recurrence using Master Method –
- (i) $T(n) = 9T(n/3) + n^3$
 - (ii) $T(n) = 16T(n/4) + n$
 - (iii) $T(n) = 3T(n/4) + n \log n$
 - (iv) $T(n) = 2T(n/4) + \sqrt{n}$
- (b) Find an optimal solution for matrix multichain with dimension sequence.
 $\langle 15, 8, 10, 12, 3, 11, 4 \rangle$
7. Answer any four out of the following :-
- (a) Compare BFS and DFS Techniques
 - (b) Explain B+ Tree with operations insertion and deletion
 - (c) Chinese remainder theorem
 - (d) Comment on any two modules of computation
 - (e) Define θ , O , Ω notations. State their interrelationship.