Code No. D-0423/O

FACULTY OF INFORMATICS

M.C.A. (CBCS) III - Semester (Backlog) (2020-2021 Batch) (Old)
Examination, April 2022
Subject: Design and Analysis of Algorithm

Time: 3 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
Note: Answer any five questions from the following.
All questions carry equal marks.

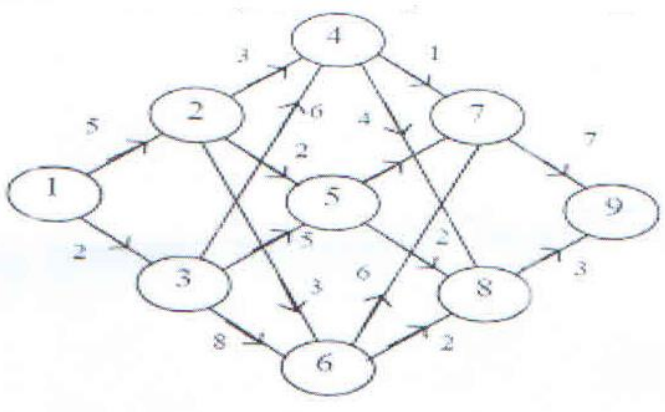
1 (a) Define an algorithm. Explain about randomized algorithms.
(b) Explain the different criteria of algorithm.

2 (a) Discuss the insertion and deletion in a minheap.
(b) Form a minheap with the following elements and perform one deletion 1,2,3,17,19,36,7,25,100.

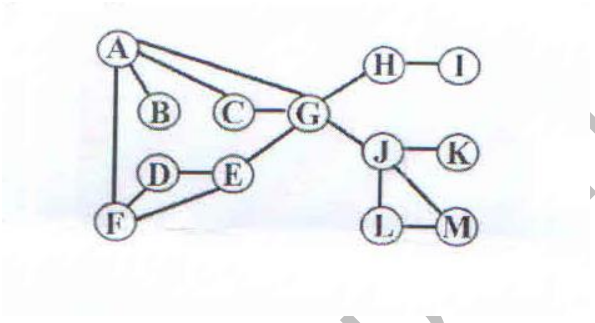
3 (a) Explain binary search.
(b) Find the elements 23,32 in the following list of elements using binary search: 2,5,8,12,16,23,38,56,72,91.

4 (a) Explain job sequencing with deadlines.
(b) Solve the following job sequencing with deadlines problem n=7; (p1…p7)=(35,30,25,20,15,12,5);(d1…d7)=(3,4,4,2,3,1,2)

5 (a) Explain about multistage graphs in detail.
(b) Solve the following multistage graphs using backward approach:

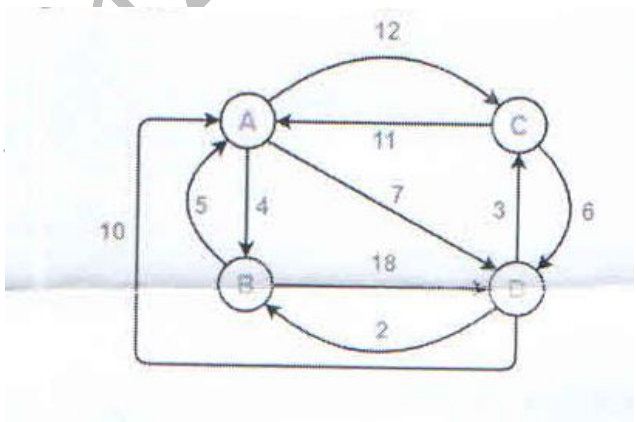


6 (a) Explain about how to find biconnected components and articulation points.
(b) Find the tree edges, back edges, biconnected components and articulation points in the following graph.



7 (a) Explain 8 queens problem.
(b) Explain 8 queens problem using a state space tree.

8 (a) Explain 0/1 knapsack problem.
(b) Solve the following travelling salesperson problem.



9 (a) Discuss in detail cook's theorem.
(b) Differentiate NP-Hard and NP-Complete problems.

10 (a) Explain about Node Cover Decision problem.
(b) Explain about flow shop scheduling problem.

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Code No. D-0422/N

FACULTY OF INFORMATICS

MCA (CBCS) III Semester (New) (Backlog) (2020-2021 Batch) Examination, April 2022

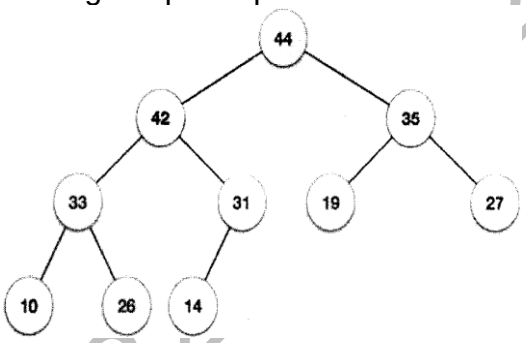
Subject: Design and Analysis of Algorithms

Time: 3 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
Note: Answer any five questions from the following.
All questions carry equal marks.

1 (a) Explain in detail about the insertion and deletion in queue with algorithms.
(b) Differentiate and explain;
(i) Union and Weighted union (ii) Find and Collapsing.

2 (a) Write algorithms to explain how you insert and delete an element in heap.
(b) Insert 46 in the following heap and perform one deletion.

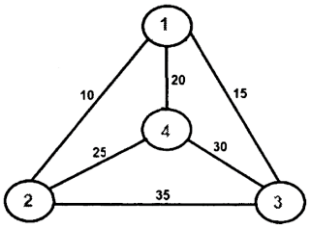


3 (a) Write an algorithm to perform merge sort.
(b) Perform merge sort for the following list:
12 11 13 5 6 7.

4 (a) Write an algorithm to solve the job sequencing with deadlies.
(b) Solve the following knapsack problem
N=7;m=15;(p1….p7)=(10,5,15,7,6,18,3);(w1…w7)=(2,3,5,7,1,4,1).

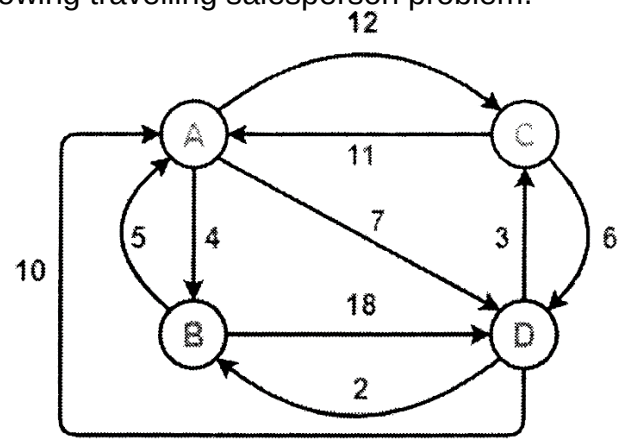
5 (a) Explain general method of dynamic programming. What is the principle of optimality?
(b) Solve the following 0/1 knapsack problem.
N=4; m=8;(p1…p4)=(4,3,2,4);(w1…w4)=(2,6,7,3).

6 (a) Write an algorithm for reliability design.
(b) Solve the following travelling salesperson problem.



7 (a) Explain 8-Queen's problem.
(b) Solve the following sum of subsets problem
M=35;w={5,7,10,12,15,18,20}.

8 (a) Explain Hamiltonian cycles.
(b) Solve the following travelling salesperson problem.



9 (a) Explain Clique decision problem.
(b) Explain Node cover decision problem.

10 (a) Explain flow shop scheduling.
(b) Explain job shop scheduling.

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