

Total No. of Questions : 8]

SEAT No. :

PA-1503

[Total No. of Pages : 3

[5926]-123

T.E. (Information Technology)

DESIGN & ANALYSIS OF ALGORITHMS

(2019 Pattern) (Semester-I) (Elective - I) (314445A)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Write bellman ford algorithm to find the shortest path and analyze it. [9]

- b) Compare dijkstras algorithm and bellman ford algorithm to find Shortest Path problem? [9]

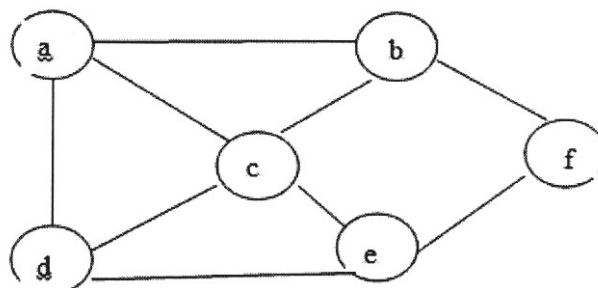
OR

Q2) a) Explain multistage graph problem (using forward computation) in detail? [9]

- b) Solve the following instances of knapsack problem using dynamic programming for number of object $n=4$. Knapsack capacity $m = 8$. [9]

Item	1	2	3	4
Weight	2	1	3	2
Value	\$12	\$10	\$20	\$15

Q3) a) Find the Hamiltonian cycle by using backtracking method in the given graph. [9]



P.T.O.

- b) Consider Knapsack problem: $n=8$, [8]
 $(w_1, w_2, w_3, w_4, w_5, w_6, w_7, w_8) = (1, 11, 21, 33, 43, 45, 55)$,
 $p = (1, 21, 31, 33, 43, 53, 55, 65)$ $m=110$. Solve the problem using backtracking

OR

- Q4)** a) Write an algorithm for graph coloring problem using backtracking method. [9]
 b) Differentiate between backtracking and branch and bound. Draw state space tree. [8]

- Q5)** a) Explain the Branch & Bound algorithmic strategy for solving the problem, take an example of traveling salesman problem using branch & bound. [9]
 b) Explain the 8 – Queens problem & explain the following with respect to 8 – Queens problem. [9]

- State space tree
- Solution state
- State space
- Answer state
- Static tree
- Dynamic tree
- Live node
- Bounding function

OR

- Q6)** a) Describe the following with respect to B & B. [9]
 • The method
 • LC search
 • Control abstraction for LC search
 • Bounding function
 b) Solve the following instance of the knapsack problem by branch and bound algorithm for $W=16$. [9]

Item	Weight	Value in Rs.
1	10	100
2	7	63
3	8	56
4	4	12

- Q7)** a) Explain the Clique Problem. [9]
b) Give the relationship between P, NP, NP complete, and NP hard problem. [8]

OR

- Q8)** a) What do you mean by P, NP, NP complete and NP hard problem with example. [9]
b) What is non-deterministic algorithm. Write any one non-deterministic algorithm. [8]

