Total No. of Questions : 12]

SEAT No. :

P2968

[Total No. of Pages : 3

[4958]-210
T.E. (IT)
DESIGN AND ANALYSIS OF ALGORITHMS
(2008 Course) (314455) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Draw neat diagrams wherever necessary.***
2) ***Assume suitable data, if necessary.***
3) ***Figures to the right side indicate full marks.***

SECTION - I

Q1) a) Prove by induction 1 + 2 + 3 + ... + n = n(n+1)/2. **[8]**

b) Write an algorithm for searching an element in an array of size n. Calculate complexity of this algorithm. **[8]**

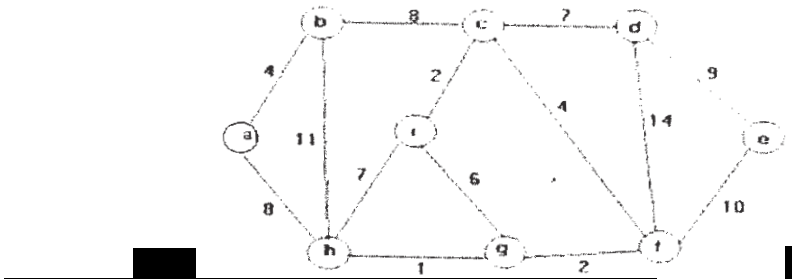
OR

Q2) a) Define best-case, worst-case and average-case efficiency. Is average-case efficiency, an average of best-case and worst-case efficiencies? **[8]**

b) Write an algorithm to find MaxElement from unsorted array of size n. Calculate complexity of this algorithm. **[8]**

Q3) a) Explain closest pair problem. **[8]**

b) Find MST using Prim's algorithm. Specify the complexity of Prim's algorithm. **[8]**

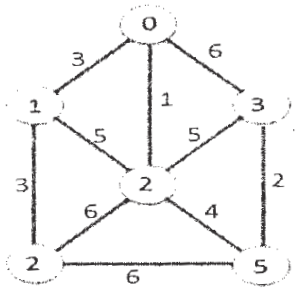


OR

P.T.O.

Q4) a) What is divide and conquer strategy? Explain Master's theorem. **[8]**

b) Find MST using Kruskal's algorithm. Specify the complexity of Kruskal's algorithm. **[8]**



Q5) a) Explain memory function? Specify its advantages? **[9]**

b) Explain knapsack problem. Why is it advantageous to solve knapsack problem using dynamic programming technique? **[9]**

OR

Q6) a) Dynamic programming is an optimization technique. Say True or False. Justify your answer. You may use an example to prove. **[9]**

b) Why is OBST better than BST? Is OBST an optimization technique? Does it use dynamic programming paradigm? **[9]**

SECTION - II

Q7) a) Write backtracking algorithm to solve N-Queen's problem. Find one solution for 4-queen's problem. **[8]**

b) Discuss graph coloring. How does it use backtracking technique? **[8]**

OR

Q8) a) W = (2,4,6,8,10) is a weight vector. If total sum, M, is 20, find all combinations of the weights that exactly add to M. **[8]**

b) What is a Hamiltonian cycle? How does it use backtracking technique? **[8]**

Q9) a) Explain for Branch and Bound- **[9]**

i) LIFO search

ii) FIFO search

iii) LC Search

b) Is Branch and Bound an optimization technique? Explain using an example. **[9]**

OR

Q10)a) Explain the terms:

Branch and Bound, LC, LIFO and Bounding function. **[9]**

b) Differentiate between Backtracking and Branch and Bound. **[9]**

Q11)a) Explain: NP - complete, NP-Hard, Decision Problem and Polynomial Time Algorithm. **[8]**

b) Write a note on halting problem. **[8]**

OR

Q12)a) What is a deterministic and non-deterministic algorithm? Write a non-deterministic algorithm for searching am element. **[8]**

b) Write a note on Cook's theorem. **[8]**