R16

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B
consists of 5 Units. Answer any one full question from each unit. Each question carries
10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) Write an algorithm to find the number of digits in the binary representation of a
   positive decimal integer.   [2]
  b) How can we measure an algorithm's running time?   [3]
  c) What is a set? List the operations that can be performed on it.   [2]
  d) Give brief note on graph coloring.   [3]
  e) State the Job – Sequencing Deadline Problem.   [2]
  f) Find an optimal solution to the knapsack instance n=4 objects and the capacity of
   knapsack m=15, profits (10, 5, 7, 11) and weight are (3, 4, 3, 5).   [3]
  g) What is Travelling Sales Man Problem?   [2]
  h) Give the statement of Reliability design problem.   [3]
  i) State the methodology of Branch and Bound.   [2]
  j) Define Bounding Function? Give the statement of 0/1 Knapsack FIFO BB.   [3]

PART - B

(50 Marks)

2.a) Explain Recursive Binary search algorithm with suitable examples.
  b) Distinguish between Merge sort and quick sort.   [5+5]

OR

3.a) What is stable sorting method? Is Merge sort a stable sorting method? Justify your
   answer.
  b) Explain partition exchange sort algorithm and trace this algorithm for n =8 elements:
   24,12, 35, 23,45,34,20,48.   [5+5]

4. Write and explain the algorithm of Bi connected components with an example. [10]

OR

5. Give the solution to the 8-queens problem using backtracking.   [10]

6. What is Minimum cost spanning tree? Explain an algorithm for generating minimum
   cost Spanning tree and list some applications of it.   [10]

OR

7.a) Explain the greedy technique for solving the Job Sequencing problem.
  b) Write with an example of Prim's algorithm.   [5+5]

8.a) Discuss the time and space complexity of Dynamic Programming traveling sales person algorithm.

b) Write an algorithm of matrix chain multiplication. [5+5]

OR

9. With the help of suitable example explain the all pairs shortest path problem. [10]

10.a) Give the 0/1 Knapsack LCBB algorithm.

b) Differentiate between deterministic and non deterministic algorithm. [5+5]

OR

11. Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance: $n = 5$, $(p1,p2,...,p5) = (10,15,6,8,4)$, $(w1,w2,..,w5) = (4,6,3,4,2)$ and $m=12$. And also find an optimal solution of the same. [10]

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