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**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

**CYCLE TEST – III – APRIL- 2020**

Fourth Semester – Computer Science and Engineering

**18CSC204J- Design and Analysis of Algorithms**

Duration: 90 Minutes Max. Marks: 50

**PART – A (10 X 1 = 10 Marks)**

Answer **ALL** Questions

1. Backtracking algorithm is implemented by constructing a tree of choices called as?  
a) State-space tree b) State-chart tree  
c) Node tree d) Backtracking tree

2. Which data structure is most suitable for implementing best first branch and bound strategy?  
a) stack b) queue  
c) priority queue d) linked list

3. In what time can the Hamiltonian path problem can be solved using dynamic programming?

a) b) )

c) d)

4. In what manner is a state-space tree for a backtracking algorithm constructed?  
a) Depth-first search b) Breadth-first search  
c) Twice around the tree d) Nearest neighbour first

5. What is the worst-case running time of Rabin Karp Algorithm?  
a) b)   
c) d)

6. What approach is being followed in Floyd Warshall Algorithm?  
a) Greedy technique b) Dynamic Programming  
c) Linear Programming d) Backtracking

7. Which of the following options match the given statement:  
Statement: The algorithms that use the random input to reduce the expected running time or memory usage, but always terminate with a correct result in a bounded amount of time.  
a) Las Vegas Algorithm b) Monte Carlo Algorithm  
c) Atlantic City Algorithm d) None of the mentioned

8. What is vertex coloring of a graph?  
a) A condition where any two vertices having a common edge should not have same color  
b) A condition where any two vertices having a common edge should always have same color  
c) A condition where all vertices should have a different color  
d) A condition where all vertices should have same color

9. To which of the following class does a CNF-satisfiability problem belong?  
a) NP class b) P class  
c) NP complete d) NP hard

10. The time complexity of the normal quick sort, randomized quick sort algorithms in the worst case is

a)  O(n2), O(n log n)                  b)  O(n2), O(n2)

c)  O(n log n), O(n2)                  d)  O(n log n), O(n log n)

**PART – B (4 X 4 = 16 Marks)**

Answer **ANY FOUR** questions

1. Solve the following 0/1 Knapsack problem using Branch and Bound.

(W(capacity of knapsack= 15)

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| --- | --- | --- | --- | --- |
| Profit | 10 | 10 | 12 | 18 |
| Weight | 2 | 4 | 6 | 9 |

1. What do you mean by Indicator Random Variable? What is it’s

significance in randomized algorithms?

1. What do you understand by string matching algorithms? List any three such algorithms.
2. Discuss the travelling salesman problem and show how it is an instance of the Hamiltonian Circuit problem
3. Differentiate Backtracking and Branch and Bound.

**PART – C (2 X 12 = 24 Marks)**

Answer **ALL** questions

16. a) What is backtracking? What kind of search technique is used for backtracking? Show how the technique can be applied to a 4x4 board using state space tree with algorithm.

**(OR)**

b) For given set w ={5,10,12,13,15,18}and target sum=30, find all possible combination of subsets using state space tree with algorithm.

17. a) What do you understand by spurious hits? For string matching, how many spurious hits does the Rabin-Karp matcher encounters in Text T = 31415926535....... and Pattern  P = 26. Calculate hash function as (P modulo (length of text string))

**(OR)**

b) Differentiate between deterministic algorithms and non- deterministic algorithms and accordingly explain in detail NP, Np Hard and NP Complete.