

C

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 54203**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Computer Science and Engineering

15UCS403 - DESIGN AND ANALYSIS OF ALGORITHMS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Which of the following statement is not true about an algorithm? CO1- R
  - (a) Algorithm is a sequence of unambiguous instructions
  - (b) The nonambiguity requirement for each step can be compromised
  - (c) The same algorithm can be represented in several ways
  - (d) Several algorithm for solving the same problem may exist
2. The time complexity of Matrix multiplication algorithm is CO2- R
  - (a)  $O(n)$
  - (b)  $O(n^2)$
  - (c)  $O(n^3)$
  - (d)  $O(\log n)$
3. Dynamic programming is similar to the divide-and-conquer approach, then the solution of a large problem depends on CO3- R
  - (a) Overlapping Sub problems
  - (b) Sub problems that are completely separate
  - (c) Previously obtained solutions to sub problems
  - (d) None of the above
4. The total running time of optimal binary search tree of  $n$  nodes CO4- R
  - (a)  $O(n^2)$
  - (b)  $O(n)$
  - (c)  $O(n^3)$
  - (d)  $O(n \log n)$
5. If every square of the board is visited, then the total number of knight moves of  $n$ -queen problem is CO5- R
  - (a)  $n^3-1$
  - (b)  $n-1$
  - (c)  $n^2-1$
  - (d)  $\log n-1$

PART – B (5 x 3= 15Marks)

- |     |   |        |
|-----|---|--------|
| 6.  | Define the notion of an algorithm.  | CO1- R |
| 7.  | Examine the advantages and implementation issues of Divide and Conquer Methodology. | CO2- U |
| 8.  | Explain the stable marriage problem in detail.                                      | CO3- U |
| 9.  | Describe about 'Greedy algorithm'.  | CO2- R |
| 10. | Compare Backtracking, Branch and Bound Techniques?                                  | CO4-U  |

PART – C (5 x 16= 80Marks)

- |     |   |          |      |
|-----|---|----------|------|
| 11. | (a) Explain the various asymptotic notations and basic efficiency classes.  | CO2- App | (16) |
|     | Or  |          |      |
|     | (b) Explain about the asymptotic notations and its properties.  | CO1- U   | (16) |
| 12. | (a) Explain the Mathematical Analysis of Recursive algorithms in detail   | CO2 -App | (16) |
|     | Or  |          |      |
|     | (b) Write different algorithms for generating permutations and combinations.  | CO2- U   | (16) |
| 13. | (a) Explain Warshall's and floyd's algorithm in detail  | CO2 -App | (16) |
|     | Or  |          |      |
|     | (b) Explain how dynamic programming technique is used to solve the knapsack problem with example.   | CO2- U   | (16) |
| 14. | (a) (i) Analyze Suitable method to find the optimal ordering for storage on tape problem  | CO3-Ana  | (8)  |
|     | (ii) Solve the following job sequencing with deadlines problem.<br>Given $n=7$<br>Profits $(p_1,p_2,p_3,p_4,p_5,p_6,p_7)=\{3,5,20,18,1,6,30\}$<br>Deadlines $(d_1,d_2,d_3,d_4,d_5,d_6,d_7)=\{1,3,4,3,2,1,2\}$ | CO4 -Ana | (8)  |
|     | Or  |          |      |
|     | (b) Explain about the assignment problem and travelling salesman problem in detail  | CO3-Ana  | (16) |

15. (a) Explain about P, NP and NP-Complete problems in detail. CO4- U (16)
- Or
- (b) Trace a State-Space tree to solve the 8-queens problem by with the help of backtracking technique. CO4- U (16)

