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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12CS214** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **Fundamentals of Computer Algorithms** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Define big ‘Oh’ notation. | (1) |
| 2. | The \_\_\_\_\_\_\_\_\_\_ of an algorithm is the amount of computer time it needs to run to completion. | (1) |
| 3. | What is the time complexity of the brute-force algorithm for searching an element in an array? | (1) |
| 4. | Give an example of a successful application of the divide-and-conquer technique. | (1) |
| 5. | What is articulation point? | (1) |
| 6. | A graph with directions specified for all its edges is called\_\_\_\_\_\_\_\_. | (1) |
| 7. | Define feasible and optimal solution. | (1) |
| 8. | What are the drawbacks of dynamic programming? | (1) |
| 9. | What data structure is used to implement backtracking algorithm? | (1) |
| 10. | What is the application of optimal binary search tree? | (1) |
| **PART B(5 X 3= 15 MARKS)** | | |
| 11. | Consider the following algorithm  Sum (n)  // Input: A Nonnegative integer n  S 0  for i 1 to n do  SS + i  return S  a. What does this algorithm compute?  b. What is its basic operation?  c. How many times is the basic operation executed? | (3) |
| 12. | Give computing time for Binary search. | (3) |
| 13. | Explain transform-and-conquer technique. | (3) |
| 14. | What are the steps to be followed in Huffman’s algorithm? | (3) |
| 15. | What are the factors that influence the efficiency of the backtracking algorithm? | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | Explain the general framework for analyzing the efficiency of an algorithm. | (8) |
| b. | Explain following asymptotic order of growth rate.  i) O(g(n)) ii) θ(g(n)) iii) Ω(*g*(*n*)) | (7) |
| (OR) | | | |
| 17. | a. | Explain all asymptotic notations. | (15) |
| 18. | a. | Write the pseudo code of Brute Force String Match algorithm and analyze the time complexity of the algorithm. | (15) |
| (OR) | | | |
| 19. | a. | Write the algorithm for binary search and find its time complexity. | (8) |
| b. | Write the algorithm for bubble sort, Illustrate the operation of bubble sort on array A.  A={5, 1, 4, 2, 8} | (7) |
| 20. | a. | Show that DFS and BFS visit all vertices in a connected graph G reachable from any one of vertices. | (15) |
| (OR) | | | |
| 21. | a. | Sort the given list by heap sort using the array representation of heaps. 2, 9, 7, 6, 5, 8 (increasing order) and explain how heap sort is carried out. | (15) |
| 22. | a. | What is minimum spanning tree? Write a pseudo code to construct a minimum spanning tree using Prim’s algorithm. Discuss with a suitable example. | (15) |
| (OR) | | | |
| 23. | a. | Discuss the Floyd-Warshall Algorithm with its analysis and an example. | (15) |
| 24. | a. | Using backtracking technique, solve the following instance of the subset sum problem  S = <3,5,6,7>and d=15 | (8) |
| b. | Explain the backtracking solution to solve N-Queens problem. | (7) |
| (OR) | | | |
| 25. | a. | What is Traveling Salesman Problem? Write the approximation algorithms for Traveling Salesman Problem. | (15) |

ALL THE BEST