UID No: ……………

Semester:5th

Subject Title: DAA Subject Code: CST-311

Time: 3 Hour Maximum Marks: 60

**Instructions: Attempt all questions**

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| Q. No | Statement | CO mapping |
| **Section A**  5 x 2 = 10 marks | | |
| 1 | Explain time and space complexity. | CO5 |
| 2 | Explain optimal solution. | CO5 |
| 3 | Explain how to represent graphs. | CO5 |
| 4 | Write a note on N and NP classes. | CO5 |
| 5 | Illustrate applications of Dijkstra algorithm. | CO5 |
| **Section B**  4 x 5 = 20 marks | | |
| 6 | Find the complexity of the recurrence:    T(n) = { 2T(n-1) – 1, if n>0,  { 1, otherwise | CO5 |
| 7 | 1. Consider the following set of integers. {20,25,57,48,37,12,92,86,33} If one uses the quick sort algorithm to sort the above set of integers, how many p to completely sort the file? Note: you may choose middle element as a pivot? | CO5 |
| 8 | Differentiate between Breadth first search & Depth First search. | CO5 |
| 9 | Write a brief note on Chinese Remainder theorem. | CO5 |
| **Section C**  3 x 10 = 30 marks | | |
| 10 | Construct AVL tree.  1 2 3 4 5 6 7 8 9 10 | CO5 |
| 11 | **a)** How many bits may be required for encoding the message ‘mississippi’? Following is the frequency table of characters in ‘mississippi’ in non-decreasing order of frequency:    **b)** The characters a to h have the set of frequencies based on the first 8 Fibonacci numbers as follows: a : 1, b : 1, c : 2, d : 3, e : 5, f : 8, g : 13, h : 21  A Huffman code is used to represent the characters. What is the sequence of characters corresponding to the following code?  110111100111010  **c)** What are the steps to build a Huffman Tree from input characters? Explain with the help of an example. | CO5 |
| 12 | Explain spurious hits in Rabin-Karp string matching algorithm with example. Working modulo q=13, how many spurious hits does the Rabin-Karp matcher encounter in the text T = 2359023141526739921 when looking for the pattern P = 31415? | CO5 |