Bachelor Level / fifth-semester / Science Full marks: 80 **Computer Science and Information Technology(CSC314)** Pass marks: 32 (Design and Analysis of Algorithms) Time: 3 hours Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all questions.

1. **What do you mean by complexity of an algorithm? Explain RAM model for the analysis of algorithms with examples.**

2. **What is the recurrence tree method? Determine a good asymptotic upper bound of the following relation using recurrence tree method.**

$$T(n) = 3T\left(\frac{n}{2}\right) + n$$

3. **What is heap sort? Trace the following data using heap sort algorithm.**

   X[]={10, 8, 12, 70, 20, 5, 30}

4. **What is Huffman code? Write down Hoffman algorithm and find out its complexity.[**

5. **What is dynamic programming? Find the longest common subsequence between "XYYXXY" and "XXYXXYY".**

6. **Explain Kruskal's algorithm for computing a spanning tree of weighted connected graphs with an example of a seven nodes graph.**

7. **What is left turn and right turn? How to detect the intersection of two line segments? Explain with examples.**

8. **What types of problems are called class-P, class-NP and NP-completeness? Explain with examples.**

9. **What is the short path problem? Explain Dijkstra's algorithm to compute the shortest path.**

10. **Explain worst case, best case and average case of algorithm analysis with an example.**