# IEC College of Engineering and Technology, Greater Noida
## Department of CSE/IT
## Odd Sem., Session 2022-23
## Assignment-5

**Subject Name with Code: Design and Analysis of Algorithms (KCS-503)   Submission Date: D/M/22**

1. Explain Randomized algorithm in brief.
2. Explain NP-complete and NP-Hard.
3. Write Rabin Karp string matching algorithm. Working modulo q=11, how many spurious hits does the Rabin karp matcher in the text T=3141592653589793, when looking for the pattern P=26.
4. Write and explain the algorithm to solve vertex cover problem using approximation algorithm.
5. Explain and Write the Knuth-Morris-Pratt algorithm for pattern matching also write its time complexity.
6. Explain Fast Fourier Transform in brief.
7. Write an algorithm for naive string matcher?
8. Write KMP algorithm for string matching? Perform the KMP algorithm to search the occurrences of the pattern abaab in the text string abbabaabaabab.
9. Write short notes on following:
    - (i.)    Randomized algorithm.
    - (ii.)    NP- complete and NP hard.

10. What is approximation algorithm? Explain set cover problem using approximation algorithm.
11. The recurrence $T(n) = 7T(n/2) + n2$ describe the running time of an algorithm A.A competing algorithm A has a running time of $T'(n) = aT'(n/4) + n\,2$ .What is the largest integer value for a A' is asymptotically faster than A?
12. Discuss the problem classes P, NP and NP –complete .with class relationship.
13. Compute the prefix function $\pi$ for the pattern P= a b a c a b using KNUTH-MORRIS –PRATT Algorithm. Also explain Naïve String Matching algorithm.
14. Explain Approximation and Randomized algorithms.
15. Explain applications of FFT.
16. What do you mean by polynomial time reduction?
17. Define NP-Hard and NP- complete problems. What are the steps involved in proving a problem NP-complete? Specify the problems already proved to be NP-complete.
18. Describe in detail Knuth-Morris-Pratt string matching algorithm. Compute the
19. prefix function $\pi$ for the pattern ababbabbbabbabbabbabbabb when the alphabet is $\Sigma = \{a,b\}$.
20. What is an approximation algorithm? What is meant by P (n) approximation algorithms? Discuss approximation algorithm for Travelling Salesman Problem.