**2CS503 Design and Analysis of Algorithms**

**Tutorial 3: Recurrences**

Q-1 Obtain the total solutions of the following recurrence relations:-

1. T(n) – 4T(n-1) + 4T(n-2) = 0
2. T(n) – 5T(n-1) + 6T(n-2) = 0
3. T(n) + 5T(n-1) + 6T(n-2) = 3n2 – 2n + 1

Q-2 Solve the following by using Recursion tree method:-

1. T(n) = 3T(n/4) + n2
2. T(n) = 4T(n/3) + n
3. T(n) = 4T(n/2) + n
4. T(n) = T(9n/10) + T(n/10) + cn

Q-3 Solve the following by using Master method:-

1. T(n) = 8T(n/2) + 1000n2
2. T(n) = 2T(n/2) + 10n
3. T(n) = 2T(n/2) + n2
4. T(n) = 3T(n/3) + nlogn
5. T(n) = 9T(n/3) + n
6. T(n) = 27T(n/3) + n3
7. T(n) = 8T(n/2) + n3**/**logn
8. T(n) = 2T(n/2) + n**/**logn
9. T(n) = 0.5T(n/2) + 1**/**n
10. T(n) = T(n/2) + n(2 – cosn)

Q-4 Solve the following using “Change of variable” method:-

T(n) = √nT(√n) + n

Q-5 Apply “Intelligent Guesswork” method to solve the following: -

T(n) = 3T(n/2) + n (n is an exact power of 2)

Q-6 Apply “Range transformation” method to the solve the following: -

T(n) = nT2(n/2) (n is an exact power of 2 and T(1) = 1/3)