**MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY**

**FIRST TERM (B.TECH CSE ) Assignment I – CSE (V Semester)**

**COURSE CODE: ETCS-301**

**COURSE TITLE: ALGORITHM ANALYSIS AND DESIGN**

Q1: If f(n)=amnm+am-1nm-1+…….+a1n+a0, then prove f(n)=O(nm)

Q2: If f(n)=amnm+am-1nm-1+…….+a1n+a0 & am >0 then prove f(n)=Ω (nm)

Q3. If f(n)=amnm+am-1nm-1+…….+a1n+a0 & am >0 then prove f(n)=Θ (nm)

Q4. Solve the following recurrence relations: a) T(n) = 3T(n/2) + n2

b) T(n) = 16T(n/4) + n

c) T(n) = 2T(n/4) + n0.51

1. T(n) = 3T(n/4) + n log n
2. T(n) = 4T(n/2) + n / log n

f) T(n) = 7 T(n/3) + n2

h) T(n) = T (√n) +1 i) T(n)=T(9n/10)+n

j)T(n)=16 T(n/4)+n2 k)T(n)=7T(n/3)+n2

l) T(n) = 3T(n/2) + n log n Q5: Prove that lg(n!)=O(nlgn)

Q6:Is 2n+1=O(2n)?

Q7. Devise a divide and conquer algorithm to find the maximum and minimum element of an array A [p-------r]. Also give the recurrence relation.

Q8. Prove the master’s theorem.

Q9. Derive the time complexity of Strassen Matrix Multiplication

Q.10. How Randomized quicksort is better than standard quicksort. Explain with an example.