O()

1 Find upper bound for f(n) = 3n + 8

2 Find upper bound for f(n) = n ^2 + 1

3 Find upper bound for f(n) = n^ 4 + 100n^2 + 50

4 Find upper bound for f(n) = 2n ^3 – 2n^ 2

5 Find upper bound for f(n) = n

6 Find upper bound for f(n) = 410

Omega()

1 Find lower bound for f(n) = 5n ^2 .

2 Prove f(n) = 100n + 5 ≠ Ω(n 2 ).

Theta()

1 Find Θ bound for f()=((n^2)/2 )- n/2

2 Prove n ≠ Θ(n 2

3 Prove 6n 3 ≠ Θ(n 2 )

4 Prove n ≠ Θ(logn)

**Divide conquer algorithms and recurrence relation.**

1 T(n) = 3T (n/2) + n 2

2 T(n) = 4T (n/2) + n 2

3 T(n) = T(n/2) + n 2

5 T(n) = 16T(n/4) + n Solution: T(n) = 16T (n/4) + n => T(n) = Θ(n 2 ) (Master Theorem Case 1)

Problem-6 T(n) = 2T(n/2) + nlogn Solution: T(n) = 2T(n/2) + nlogn => T(n) = Θ(nlog 2n) (Master Theorem Case 2.a)

Problem-7 T(n) = 2T(n/2) + n/logn Solution: T(n) = 2T(n/2)+ n/logn =>T(n) = Θ(nloglogn) (Master Theorem Case 2. b) Problem-8 T(n) = 2T (n/4) + n 051 Solution: T(n) = 2T(n/4) + n 051 => T (n) = Θ(n 0.51 ) (Master Theorem Case 3.b) Problem-9 T(n) = 0.5T(n/2) + 1/n Solution: T(n) = 0.5T(n/2) + 1/n => Does not apply (a < 1) Problem-10 T (n) = 6T(n/3)+ n 2 logn Solution: T(n) = 6T(n/3) + n 2 logn => T(n) = Θ(n 2 logn) (Master Theorem Case 3.a) Problem-11 T(n) = 64T(n/8) – n 2 logn Solution: T(n) = 64T(n/8) – n 2 logn => Does not apply (function is not positive) Problem-12 T(n) = 7T(n/3) + n 2 Solution: T(n) = 7T(n/3) + n 2 => T(n) = Θ(n 2 ) (Master Theorem Case 3.as) Problem-13 T(n) = 4T(n/2) + logn Solution: T(n) = 4T(n/2) + logn => T(n) = Θ(n 2 ) (Master Theorem Case 1) Problem-14 T(n) = 16T (n/4) + n! Solution: T(n) = 16T (n/4) + n! => T(n) = Θ(n!) (Master Theorem Case 3.a) Problem-15 T(n) = T(n/2) + logn Solution: T(n) = T(n/2) + logn => T(n) = Θ( ) (Master Theorem Case 1) Problem-16 T(n) = 3T(n/2) + n Solution: T(n) = 3T(n/2) + n =>T(n) = Θ(n log3 ) (Master Theorem Case 1) Problem-17 T(n) = 3T(n/3) + Solution: T(n) = 3T(n/3) + => T(n) = Θ(n) (Master Theorem Case 1) Problem-18 T(n) = 4T(n/2) + cn Solution: T(n) = 4T(n/2) + cn => T(n) = Θ(n 2 ) (Master Theorem Case 1) Problem-19 T(n) = 3T(n/4) + nlogn Solution: T(n) = 3T(n/4) + nlogn => T(n) = Θ(nlogn) (Master Theorem Case 3.a) Problem-20 T (n) = 3T(n/3) + n/2 Solution: T(n) = 3T(n/3)+ n/2 => T (n) = Θ(nlogn) (Master Theorem Case 2.a)