Question 1 [1 Marks]

What is the time complexity of fun()?

```
int fun(int n)
{
  int count = 0;
  for (int i = 0; i < n; i++)
     for (int j = i; j > 0; j--)
        count = count + 1;
  return count;
}
```

A Theta (n)

✓ Theta (n^2)

C Theta (n*Logn)

D Theta (nLognLogn)

Question 2 [1 Marks]

Let w(n) and A(n) denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. which of the following is ALWAYS TRUE? (GATE CS 2012)
(A) $A(n) = \Omega(W(n))$
(B) $A(n) = \Theta(W(n))$
(C) $A(n) = O(W(n))$
(D) $A(n) = o(W(n))$

A A

B B

✓ C

D D

Question 3 [1 Marks]

Which of the following is not O(n^2)?

A (15^10) * n + 12099

B n^1.98

✓ n^3 / (sqrt(n))

D (2^20) * n

Explanation
The order of growth of option c is $n^{2.5}$ which is higher than n^2.

Your submitted response was correct.

Question 4 [1 Marks]

Which of the given options provides the increasing order of asymptotic complexity of functions f1, f2, f3 and f4?

```
f1(n) = 2^n

f2(n) = n^(3/2)

f3(n) = nLogn

f4(n) = n^(Logn)
```

✓ f3, f2, f4, f1

B f3, f2, f1, f4

C f2, f3, f1, f4

D f2, f3, f4, f1

Question 5 [1 Marks]

Consider the following program fragment for reversing the digits in a given integer to obtain a new integer. Let n = D1D2...Dm

```
int n, rev;
rev = 0;
while (n > 0)
{
   rev = rev*10 + n%10;
   n = n/10;
}
```

The loop invariant condition at the end of the ith iteration is: (GATE CS 2004)

✓ n = D1D2....Dm-i and rev = DmDm-1...Dm-i+1

B n = Dm-i+1...Dm-1Dm and rev = Dm-1....D2D1

C n != rev

D n = D1D2....Dm and rev = DmDm-1...D2D1

Question 6 [1 Marks]

Consider the following function

```
int unknown(int n) {

   int i, j, k = 0;

   for (i  = n/2; i <= n; i++)

       for (j = 2; j <= n; j = j * 2)

           k = k + n/2;

   return k;
```

A. A

✓ B. B

C. C

D. D

Question 7 [1 Marks]

The recurrence equation

$$T(1) = 1$$

$$T(n) = 2T(n - 1) + n, n \geq 2$$

evaluates to

✓ A. 2^{n + 1}- n - 2

B. 2ⁿ - n

C. 2^{n + 1} - 2n - 2

D. 2ⁿ + n

Question 8 [1 Marks]

Consider the following three claims
I (n + k)^m = θ(n^m), where k and m are constants
II 2^(n + 1) = 0(2^n)
III 2^(2n + 1) = 0(2^n)
Which of these claims are correct? (GATE CS 2003)

✓ A. I and II

B. I and III

C. II and III

D. I, II and III

Question 9 [1 Marks]

Consider the following C code segment

```
int f (int x)

{

      if (x < 1)  return 1;

      else return (f(x-1) + g(x))

}
```

A Linear

✓ Exponential

C Quadratic

D Cubic

Question 10 [1 Marks]

What is the time complexity of following function fun()? Assume that log(x) returns log value in base 2.

```
void fun()

{

   int i, j;

   for (i=1; i<=n; i++)

      for (j=1; j<=log(i); j++)

         printf("GeeksforGeeks");
```

A Θ(n)

✓ Θ(nLogn)

C Θ(n^2)

D Θ(n^2(Logn))