Q-1 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)

B) Theta (n^2)

C) Theta (n*Logn)

D) Theta (nLognLogn)

Ans : B) Theta (n^2)

Q-2 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)=Ω(W(n))

(B) A(n)=Θ(W(n))

(C) A(n)=O(W(n))

(D) A(n)=o(W(n))

A) A

B) B

C) C

D) D

Ans : C) C

Q-3 Which of the following is not O(n^2)?

A) (15^10) * n + 12099

B) n^1.98

C) n^3 / (sqrt(n))

D) (2^20) * n

Ans : C) n^3 / (sqrt(n))

Q-4 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)

A) f3, f2, f4, f1

B) f3, f2, f1, f4

C) f2, f3, f1, f4

D) f2, f3, f4, f1

Ans : A) f3, f2, f4, f1

Q-5 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:

A) 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

Ans : A) n = D1D2….Dm-i and rev = DmDm-1…Dm-i+1

Q-6 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;
}
```

What is the returned value of the above function? (GATE CS 2013)

(A) Θ(n2)

(B) Θ(n2Logn)

(C) Θ(n3)

(D) Θ(n3Logn)

Ans : (B) Θ(n2Logn)

Q-7 The recurrence equation

T(1) = 1

T(n) = 2T(n - 1) + n, n ≥ 2

evaluates to

A) 2n + 1- n - 2

B) 2n - n

C) 2n + 1 - 2n - 2

D) 2n + n

Ans : A) 2n + 1- n - 2

Q-8 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?

A) I and II

B) I and III

C) II and III

D) I, II and III

Ans : A) I and II

Q-9 Consider the following C code segment

```
int f (int x)
{
    if (x < 1)  return 1;
     else return (f(x-1) + g(x))
}
int g (int x)
{
     if (x < 2) return 2;
     else return (f(x-1) + g(x/2));
}
```

Of the following, which best describes the growth of f(x) as a function of x?

A) Linear

B) Exponential

C) Quadratic

D) Cubic

Ans : B) Exponential

Q-10 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)

B) Θ(nLogn)

C) Θ(n^2)

D) Θ(n^2(Logn))

Ans : B) Θ(nLogn)