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)

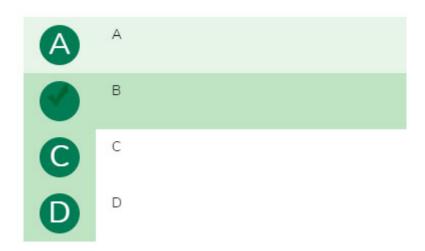
        k = k + n/2;

        return k;
}</pre>
```

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

(A)
$$\Theta(n^2)$$

(B) $\Theta(n^2 \operatorname{Log} n)$
(C) $\Theta(n^3)$
(D) $\Theta(n^3 \operatorname{Log} n)$



Explanation

In the below explanation, ' \wedge ' is used to represent exponent:

The outer loop runs n/2 or Theta(n) times.

The inner loop runs (Logn) times (Note that j is multiplied by 2 in every iteration).

So the statement k = k + n/2; runs Theta(nLogn) times.

The statement increases value of k by n/2.

So the value of k becomes n/2*Theta(nLogn) which is Theta($(n^2)*Logn$).