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;

}
```

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) $\Theta(n^3 \operatorname{Log} n)$

A

A

B

C

C

D

D

Explanation

In the below explanation, '^' 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).