QUIZ-1

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Sub- Algorithms Analysis and Design-1 (CSE2631) **Section-24E1R1**

Full Marks-10 **Time- 30 minutes**

CO1-To apply knowledge of computing and mathematics to algorithm, running time, Asymptotic analysis

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1. In the following C function, let n ≥ m [GATE-2007] 2

```
int gcd(n, m){
   if(n % m == 0)
        return m;
   n = n % m;
   return gcd(m, n);
}
```

How many recursive calls are made by this function?

(a) Θ(log n) (b) Ω(n) (c) Θ(log log n) (d) Θ(√n)

2. The recurrence relation T(1) = 2, T(n) = 3T (n/4) + n has the solution T(n) equal to? [GATE-1996] 2

3. Consider the following two functions $g_1(n) = \begin{cases} n^3 & \text{for } 0 \le n < 10,000 \\ n^2 & \text{for } n \ge 10,000 \end{cases}$ and $g_2(n) = \begin{cases} n & \text{for } 0 \le n < 100 \\ n^3 & \text{for } n > 100 \end{cases}$

Which one of the following is TRUE? [GATE-1994] 2

(a) $g_1(n)$ is $O(g_2(n))$ (b) $g_1(n)$ is $O(n^3)$ (c) $g_2(n)$ is $O(g_1(n))$ (d) $g_2(n)$ is $O(n)$

4. Let us consider two algorithms A, and B running on the same machine M. For inputs of size n, algorithm A runs in $8n^2$ steps while algorithm B runs in 64nlgn steps. For which values of n does algorithm A beat algorithm B? 2

5. Solve the recurrence T(n) = 4T (⌊n/2⌋) + Θ(n) using Masters method and provide the asymptotic upper bound for T(n). 2