QUIZ-1

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Sub- Algorithm Analysis and Design-1 (CSE2631) **Section-23412C3**

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

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

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Question 1

Consider the following three functions.

$f_1 = 10^n \quad f_2 = n^{\log n} \quad f_2 = n^{\sqrt{n}}$ f

Which one of the following options arranges the functions in the increasing order of asymptotic growth rate?

(A) f_1, f_2, f_3 (B) f_3, f_2, f_1 (C) f_2, f_3, f_1 (D) f_2, f_1, f_3

Question 2

Consider the following recurrence relation

$$T(n) = \begin{cases} T(n/2) + T(2n/5) + 7n & \text{if } n > 0 \\ 1 & \text{if } n = 0 \end{cases}$$

Which one of the following options is correct?

(A) $T(n) = \Theta(n \log n)$

(B) $T(n) = \Theta\left((\log n)^{5/2}\right)$

(C) $T(n) = \Theta\left(n^{5/2}\right)$

(D) $T(n) = \Theta(n)$

Question 3

Which one of the following correctly determines the solution of the recurrence relation with T(1) = 1?

T(n) = 2 T(n/2) + log n

(A) $\theta(n)$ (B) $\theta(n \log n)$ (C) $\theta(n^2)$ (D) $\theta(\log n)$

Question 4: For given pairs of functions, determine whether $\boldsymbol{f(n) = O(g(n))}$ or $\boldsymbol{g(n) = O(f(n))}$.

$f(n) = 2 (\log n)^2$ and $g(n) = \log n + 1$

Question 5: Given an array, write a pseudocode to find the largest sum contiguous subarray in O(n) complexity.