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Mock Exam/Midterm

Duration: 1 hour

Multiple Choice Questions

1. What is the approximation for the summation $\sum_{i=0}^{n-1}(i^{2}+1)^{2}$ as n approaches infinity?
   A) $\frac{1}{k+1}$
   B) $\frac{9}{5}n^{5}$
   C) $2\sum_{i=1}^{n}lg i - 2lg n$
   D) $n lg n$

2. What is the approximation for $\frac{1}{5}n^{\frac{1}{5}} - n^{4}$ as n approaches infinity?
   A) $2n lg n - 2lg n \approx n lg n$
   B) $\frac{9}{5}n^{5} \in \Theta(n^{5})$
   C) $2lg i^{2}$
   D) $\sum_{i=0}^{n-1}(i^{4}+2i^{2}+1)$

3. The summation $\sum_{i=2}^{n-1}lgi^{2}$ is equivalent to:
   A) $\sum_{i=1}^{n}lgi - 2lgi$
   B) $\sum_{i=0}^{n-1}(i^{4}+2i^{2}+1)$
   C) $\sum_{i=1}^{\frac{n}{2}n}{\dot{t}}^{4} - n^{4}$
   D) $\frac{1}{k+1}$

4. What is the formula for $\sum_{-2}^{\infty}lgi$?
   A) $2\sum_{i=1}^{n}lgi - 2lgi - 2lgn$
   B) $n lg n$
   C) $2lg i^{2}$
   D) $\frac{1}{5}n^{\frac{1}{5}}$

5. The sum $\approx \frac{1}{k+1}n^{4+1} - n^{4}$ is in:
   A) $\Theta(n^{5})$
   B) $\approx 2n lg n - 2lg n$
   C) $\approx n lg n$
   D) $\sum_{i=0}^{n}(i^{2}+1)^{2}$

True or False Questions

6. True/False: The sum of $\sum_{i=0}^{n}(i^{2}+1)^{2}$ is equal to $\sum_{i=0}^{n-1}(i^{4}+2i^{2}+1)$.
7. True/False: The sum $\approx \frac{1}{k+1}n^{4+1} - n^{4}$ is in $\Theta(n l o g n)$.
8. True/False: $\sum_{i=2}^{n-1}lgi^{2} = 2\sum_{i=1}^{n}lgi - 2lgi$.
9. True/False: The sum $\approx2n lg n-2lg n appr oxn lg n$ as n approaches infinity.
10. True/False: The formula $\sum_{-2}^{\infty}lgi = 2\sum_{i=1}^{n}lgi - 2lgi - 2lgn$.

Fill in the Blank Questions

11. The sum $\approx \sum_{i=0}^{n-0}i^{4} = \sum_{i=1}^{n}i^{4} + \underline{\hspace{1cm}}^{4} - n^{4}$.
12. The sum $\approx2n lg n - 2lg n \approx n lg n \in \Theta(\underline{\hspace{1cm}})$.
13. The approximation for the summation $\sum_{i=0}^{n-1}(i^{2}+1)^{2}$ as n approaches infinity is $\frac{1}{\underline{\hspace{1cm}}+1}n^{4+1} - n^{4}$.
14. The summation $\sum_{i=2}^{n-1}lgi^{2} = \sum_{i=1}^{n}lgi - \underline{\hspace{1cm}}lgi$.
15. The sum $\approx \frac{1}{5}n^{\frac{1}{5}} - n^{4}$ is equivalent to $\underline{\hspace{1cm}}$.

Word Problem Questions

16. A series of values is given by $1^{2} + 2^{2} + 3^{2} + \ldots + n^{2}$. Determine the summation formula for this series.
17. Calculate the approximation of the sum $\sum_{i=1}^{100}lg i$.
18. If the sum of $lg i$ from $i=1$ to n is $2lgn$, what is the value of n?
19. Suppose the sum of n^{4} from 1 to 10 is 11110. Find the sum of n^{4} from 1 to 20.
20. Evaluate the sum $\sum_{i=1}^{5}(i^{2}+1)$.

Answer Sheet

1. A) $\frac{1}{k+1}$
2. A) $\frac{1}{5}n^{\frac{1}{5}} - n^{4}$
3. A) $\sum_{i=1}^{n}lgi - 2lgi$
4. A) $2\sum_{i=1}^{n}lgi - 2lgi - 2lgn$
5. A) $\Theta(n^{5})$

6. True
7. False
8. True
9. True
10. True

11. 0
12. $n lg n$
13. k
14. 2
15. $\frac{9}{5}n^{5}$

16. $\frac{n(n+1)(2n+1)}{6}$
17. ≈ 458
18. 10
19. 44440
20. 35

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