BENNETT UNIVERSITY
TIMES OF INDIA GROUP

EMAT101L

Engineering Calculus

Quiz Test 1

Total marks: 10 Time: 10 minutes

Each question carries 2 marks.

---

1. Find the supremum and infimum of $S = \left\{(-1)^n \left(\frac{1}{6} - \frac{6}{n}\right) : n \in \mathbb{N}\right\}$.

   (a) $\sup(S) = \frac{1}{6}, \quad \inf(S) = -\frac{1}{6}$

   (b) $\sup(S) = \frac{1}{6}, \quad \inf(S) = -\frac{17}{6}$

   (c) $\sup(S) = \frac{35}{6}, \quad \inf(S) = -\frac{1}{6}$

   (d) $\sup(S) = \frac{35}{6}, \quad \inf(S) = -\frac{17}{6}$

2. Which of the following sequences converge? Select all that apply.

   I. 100, 80, 60, 40, ...

   II. 0,5,0,5,0,...

   III. $a_n = 5\left(\frac{3}{2}\right)^n$

   IV. $a_1 = 4, a_n = \frac{1}{2}a_{n-1}$

   (a) I., III., IV. (b) IV. (c) III. (d) all of the above

3. Choose the sequence for which $\lim_{n\to\infty} a_n = e$.

   (a) $a_n = 1 + \frac{1}{n^n}$

   (b) $a_n = \left(1 + \frac{1}{n}\right)^n$

   (c) $a_n = \left(n + \frac{1}{n}\right)^n$

(d) None of them

4. Find the supremum and infimum values of $S = \{x \in \mathbb{Q} : |x - 2| < 1\}$.

   (a) $\sup(S) = 1$ and $\inf(S) = -1$.

   (b) $\sup(S) = 3$ and $\inf(S) = -1$.

   (c) $\sup(S) = 3$ and $\inf(S) = 1$.

   (d) $\sup(S) = 2$ and $\inf(S) = -1$.

5. Let A be a set and L be a real number. If $\sup(A) = L$, this means that

   (a) $a \leq L$, for every $a \in A$.

   (b) L lies in A and L is larger than every other element of A.

   (c) Every number less than L lies in A, and every number greater than L does not lie in A.

   (d) $\inf(A) \neq \sup(A)$.