Let $\{a_n\}$ be bounded sequence.

let $a_n = \frac{1}{n}$ which is bounded between 0 & 1

$0 < \frac{1}{n} \leq 1$

Define $x_n = \sup\{a_k : k > n\}$

$x_1 = \sup\{\frac{1}{k} : k > 1\} = \frac{1}{2}$

$x_2 = \sup\{\frac{1}{k} : k > 2\} = \frac{1}{3}$

$\vdots$

$x_n = \frac{1}{n}$

$\Rightarrow \quad x_1 > x_2 > x_3 \cdots > x_n$

(decreasing sequence and bounded also)

option ~~(1), (2) are~~ (A) & (B) are discarded

option ( ) is correct

proof :- since a_n is bounded sequence

$\Rightarrow \exists\, m \in \mathbb{R}$ such that $\boxed{|a_n| \leq m}$

or $\boxed{-m \leq a_n \leq m}$ $\forall n \in \mathbb{N}$

$x_n = m \Rightarrow \boxed{\lim_{n \to \infty} x_n = m}$

Thus option is correct