Given battery has \( \text{emf} \ \mathcal{E} = 10 \ \text{V} \) and the internal resistance \( r = 1 \ \Omega \), as shown in the figure below. An external resistance \( R = 100.0 \ \Omega \) is connected to the battery.

![Electrical Circuit Diagram]

Compare \( V_{AB} \) with \( \mathcal{E} \).

A) \( V_{AB} \ll \mathcal{E} \).
B) \( V_{AB} \approx \mathcal{E} \).
C) \( V_{AB} \gg \mathcal{E} \).

\[
R_{\text{total}} = R + r \\
I = \frac{\mathcal{E}}{R + r} \\
V_{AB} = \frac{R}{R + r} \mathcal{E} = \frac{100}{100 + 1} \times 10 \ \text{V} = 9.9 \ \text{V}
\]

This simple calculation shows \( V_{AB} = 9.9 \ \text{V} \approx \mathcal{E} \). In other words, when \( r \ll R \), most of the potential drop is across the external resistance \( R \).

Answer B.

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