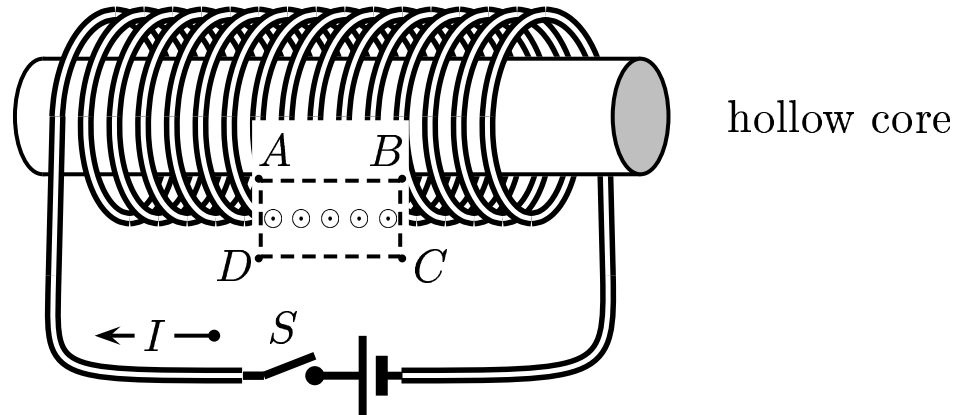


For a long solenoid with a current I , we assume the field inside B_{in} , is uniform and constant and the field outside B_{out} is 0.

To evaluate the magnetic field inside consider a rectangular Amperian loop (dashed line in cut-away view) of a height \overline{AB} and a width \overline{AC} . Let the number of wires enclosed by the loop be ΔN .



Determine the magneto-motive force (mmf) M along the loop $ABCD A$ and the current enclosed: I_{encl} .

- A) $M = +B \Delta L$ and $I_{encl} = I$.
 B) $M = -B \Delta L$ and $I_{encl} = I$.
 C) $M = +B \Delta L$ and $I_{encl} = I \Delta N$.
 D) $M = -B \Delta L$ and $I_{encl} = I \Delta N$.

The total magneto-motive force is given by $M = M_{AB} + M_{BC} + M_{CD} + M_{DA}$.

Since $B \perp \Delta S$, $M_{BC} = M_{DA} = 0$.

Since the magnetic field outside is 0, $M_{CD} = 0$.

So, $M = M_{AB} = +B \Delta L$.

By inspection $I_{encl} = I \Delta N$.

Answer **C**.