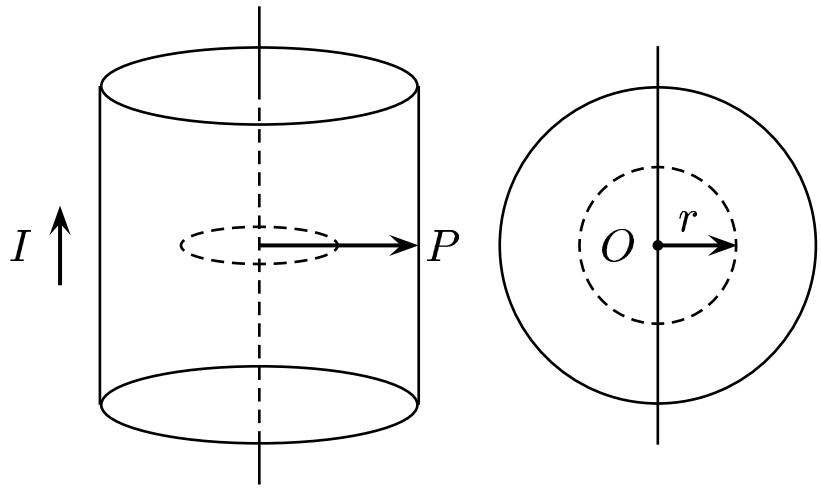
Given: Current density $J = b\,r^2$. M is defined by the Ampere's law: $M \equiv \oint_l \vec{B} \cdot d\vec{S} = \mu_0\, I_{enc}$, where the loop l is circular with radius a.



Front view **Top view**

Find out M at the surface of the conductor

A) $M = \dfrac{\pi\, a\, B}{2}$. B) $M = \pi\, a\, B$. C) $M = 2\,\pi\, a\, B$.

D) $M = 4\,\pi\, a\, B$. E) $M = 0$.

$M = B \oint ds = B\,(2\,\pi\, a)$.

Answer **C**.