An infinitely long, hollow cylindrical wire has inner radius $a$ and outer radius $b$. A current $i$ is uniformly distributed over its cross-section.

Let $r$ be the distance from the axis of the wire. Find the magnetic field as a function of $r$ for the three regions:

region 1 ($r < a$) being the hollow part inside the wire;
region 2 ($a < r < b$) being the conducting part of the wire; and
region 3 ($r > b$) being outside the wire.

Answer:
Region 1: $B =$ ______________________
Region 2: $B =$ ______________________
Region 3: $B =$ ______________________