Topic 03. Electricity and Magnetism. Part 2

1. Find the magnetic field produced by the wire with current at point O (see Fig.3), if $I = 5.0$ A, $R = 120$ mm, and the angle $2\varphi = 90°$.

2. A particle with charge 2.0 C moves through a uniform magnetic field. At one instant the velocity of the particle is $(2.0\vec{i}+4.0\vec{j}+6.0\vec{k})$ m/s and the magnetic force on the particle is $(4.0\vec{i}-20\vec{j}+12\vec{k})$ N. The x and y components of the magnetic field are equal. What is $\vec{B}$?

3. [**ADVANCED LEVEL**] An ion source is producing ^6Li ions, which have charge $+e$ and mass 9.99×10^{-27} kg. The ions are accelerated by a potential difference of 10 kV and pass horizontally into a region in which there is a uniform vertical magnetic field of magnitude $B = 1.2$ T. Calculate the strength of the smallest electric field, to be set up over the same region, that will allow the ^6Li ions to pass through undeflected.

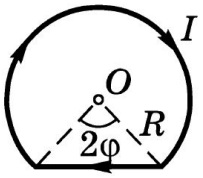

Figure 1