NDU

Faculty of Natural and Applied Sciences Quiz 6 - Spring 2003 Department of Sciences

Duration: 10 min





PHS212 - Electricity & Magnetism

The figure shows a cross section of a long thin ribbon of width w that is carrying a uniformly distributed total current i into the page. Calculate the magnitude and direction of the magnetic field B at a point P in the plane of the ribbon, at a distance dfrom its edge. (Hinr: Imagine the ribbon to be constructed from many long, thin, parallel wires.)

 $dB = \frac{dodt}{2\pi(d+x)}$

Field due to a line

$$alb = \frac{u_0 i dx}{2\pi w (d+x)}$$

$$B = \int_{0}^{\omega} \frac{u_{0} i \, dx}{2\pi \omega (d+x)}$$

$$B = \frac{u_{0}i}{2\pi w} \int_{0}^{w} \frac{dx}{(d+x)} = \frac{u_{0}i}{2\pi w} \ln (d+x) |w|$$

$$B = \frac{u_{0}i}{2\pi w} \ln (d+x) |w|$$

$$B = \frac{u_{0}i}{2\pi w} \ln (d+x) |w|$$

B wp

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