

Chapter: 8

Magnetism

Numerical Response Questions

1. Find the magnetic field due to a wire at 10 cm, if 1.3 A current is passing through the wire.

Given Data:

- Current (I) = 1.3 A
- Distance from the wire (r) = 10 cm = 0.1 m
- Magnetic permeability of free space (μ_0) = $4\pi \times 10^{-7}$ T·m/A

To Find:

- Magnetic field strength (B) at the given distance.

Solution:

The formula for the magnetic field around a long straight wire is given by:

$$B = \frac{\mu_0 I}{2\pi r}$$

Substituting the given values:

$$B = \frac{4\pi \times 10^{-7} \times 1.3}{2\pi \times 0.1}$$

Simplifying:

$$B = \frac{4 \times 10^{-7} \times 1.3}{0.2} = 2.6 \times 10^{-6} \text{ T}$$

Result:

$$\boxed{B = 2.6 \times 10^{-5} \text{ T}}$$