

Answer on Question #54817-Physics-Electromagnetism

A proton moves with a speed of 1×10^5 m/s through earth's magnetic field which has a value of 55 microtesla. At a particular location when the proton moves eastward, the magnetic force acting on it is directed straight upward, and when it moves northward, no magnetic force acts on it. What is a strength of a magnetic force when the proton moves eastward?

Solution

A strength of a magnetic force when the proton moves eastward is

$$F = qvB = 1.6 \cdot 10^{-19} \text{C} \cdot 1 \cdot 10^5 \frac{\text{m}}{\text{s}} \cdot 55 \cdot 10^{-6} \text{T} = 8.8 \cdot 10^{-19} \text{N}.$$

Answer: $8.8 \cdot 10^{-19} \text{N}$.