

Magnetic Moment of a Bar Magnet



General Aim

Determining the magnetic moment of a magnet.

Method

Deflection of magnetometer

Learning Objectives (ILOs)

- Understand the magnetization phenomena.
- Explain the effect of a magnet on a compass needle.

Theoretical Background/Context

If a bar magnet far from the magnetometer, the only significant magnetic field acting on the magnetized disk will be the horizontal component (H) of the earth's field. Accordingly, if the bar magnet is placed on the meter stick, the resultant field at the center of the magnetometer is the vector sum of both fields toward the magnetic north and toward the magnetic east. Since the pointer originally read zero, it will now read θ .

$$F = H \tan \theta$$

The magnetic moment m of a magnet of length $2L$ is obtained from

$$\cot \theta = \frac{H}{2mc} r^3$$

Principle of Work

Tangent law "deflection of needle of magnetometer due to influence of magnetic field of magnet by adjusting the magnetometer at position that cancels the earth's magnetic field".