Answer on Question #44710-Physics-Electromagnetism

A straight wire of magnetic moment M is moulded in an arc of radius R and angle 90 then magnetic moment becomes.

Solution

If the magnet is bent at an angle θ in the form of arc then

$$M' = \frac{2M \sin\frac{\theta}{2}}{\theta}.$$

As $\theta = \frac{\pi}{2}$

$$M' = \frac{2M \sin\frac{\pi}{4}}{\frac{\pi}{2}} = \frac{2M \cdot \frac{\sqrt{2}}{2}}{\frac{\pi}{2}} = \frac{2\sqrt{2}M}{\pi}.$$

Answer: $\boldsymbol{\frac{2\sqrt{2}M}{\pi}}$.