

Answer on Question #45711, Physics, Electromagnetism

A galvanometer of resistance 120 Ohm a full scale deflection with a current of 0.0005A. How would you convert it to an ammeter that reads a maximum current of 5A?

Solution

Since galvanometer is a very sensitive instrument therefore it cant measure heavy currents. In order to convert a galvanometer into an ammeter, a very low resistance known as "shunt" resistance is connected in parallel to galvanometer. Now part of current will flow through shunt and part will flow through galvanometer. As they are connected in parallel we will have

$$I_s R_s = I_g R_g$$

where I_s and R_s are shunt's current and resistance, and I_g and R_g are galvanometer's one. If total current is $I = I_s + I_g$, we will have

$$R_s = \frac{I_g}{I - I_g} R_g$$

so we find

$$R_s = \frac{0.0005}{5 - 0.0005} R_g \approx 120 \cdot 10^{-4} = 0.012 \Omega$$