

Answer on Question #50960, Physics, Electromagnetism

A galvanometer of resistance 120 ohms a full scale deflection with a current of 0.005A. How would you convert it an ammeter that reads a maximum current of 5A?

- a) connect 2000 ohm in parallel to it
- b) connect 200.12 ohms in series to it
- c) connect 20.10 ohms in series to it
- d) connect 0.012 ohms in parallel to it

Solution

Shunt resistance (R_{sh}) is connected in parallel to an ammeter (see Fig.1)

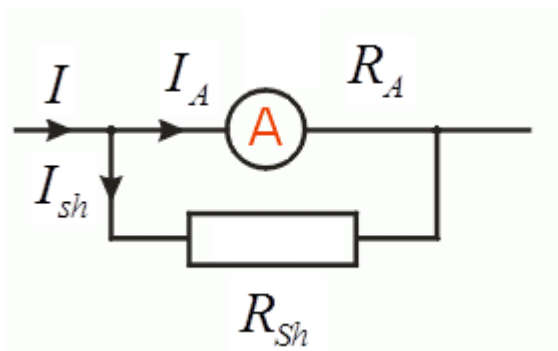


Fig.1

According to Kirchhoff's current law

$$I = I_A + I_{sh} \quad (1)$$

where $I = 5A$, $I_A = 0.005A$

According to Kirchhoff's voltage law

$$I_A R_A = I_{sh} R_{sh} \quad (2)$$

From Eq.(1) and Eq.(2)

$$R_{sh} = \frac{I_A}{I_{sh}} R_A = \frac{I_A}{I - I_A} R_A = \frac{0.005}{5 - 0.005} \cdot 120 \approx 0.12 \text{ ohms}$$