20 V 10 V 2 V

0. A moving coil galvanometer, having a resistance G, produces full scale deflection when a current I_g flows through it. This galvanometer can be converted into (i) an ammeter of range 0 to I_0 ($I_0 > I_g$) by connecting a shunt resistance R_A to it and (ii) into a voltmeter of range 0 to V ($V=GI_0$) by connecting a series resistance R_v to it. Then,

[12 April 2019, II]

(a) $R_A R_V = G^2\left(\frac{I_0 - I_g}{I_g}\right)$ and $\frac{R_A}{R_V} = \left(\frac{I_g}{I_0 - I_g}\right)^2$

(b) $R_A R_V = G^2$ and $\frac{R_A}{R_V} = \left(\frac{I_g}{I_0 - I_g}\right)^2$

(c) $R_A R_V = G^2\left(\frac{I_g}{I_0 - I_g}\right)$ and $\frac{R_A}{R_V} = \left(\frac{I_0 - I_g}{I_g}\right)^2$

(d) $R_A R_V = G^2$ and $\frac{R_A}{R_V} = \frac{I_g}{(I_0 - I_g)}$

. **(b)** In an ammeter,

$$i_g = i_0 \frac{R_A}{R_A + G}$$

and for voltmeter,

$$V = i_g (G + R_V) = G i_0$$

On solving above equations, we get

$$R_A R_V = G^2$$

and $$\frac{R_A}{R_V} = \left(\frac{i_g}{i_0 - i_g} \right)^2$$