

Answer on Question #42617-Physics-Electric Circuits

A body charged to an extent of $+40 \mu\text{C}$ is rotated in the clockwise direction in a horizontal circle at the end of an insulating string at a constant rate of 600 rpm. What is the average current produced?

Solution

The angular frequency is

$$\omega = 600 \text{ rpm} = \frac{1}{60} \cdot 600 \text{ revolutions per second} = 10 \text{ revolutions per second.}$$

Current is the ratio $\frac{\text{charge}}{\text{time}}$ which in effect is the charge passing a given point each second.

The average current is

$$I = q\omega = 40 \mu\text{C} \cdot 10 \text{ revolutions per second} = 40 \cdot 10^{-6} \cdot 10 \text{ A} = 0.4 \text{ mA.}$$

Answer: 0.4 mA.