

Answer on Question #39009, Physics, Mechanics

Question:

A particle of mass m and carrying charge $-q_1$ starts moving around q_2 along a circular path of radius r . what is period of revolution?

Answer:

Newton's second law of motion:

$$\frac{mv^2}{r} = \frac{kq_1q_2}{r^2}$$

where $\frac{v^2}{r}$ is centripetal acceleration, $\frac{kq_1q_2}{r^2}$ is Coulomb's force.

Therefore, speed of motion equals:

$$v = \sqrt{\frac{kq_1q_2}{mr}}$$

Period equals:

$$T = \frac{2\pi r}{v} = 2\pi r \sqrt{\frac{mr}{kq_1q_2}}$$

$$\text{Answer: } T = 2\pi r \sqrt{\frac{mr}{kq_1q_2}}$$