

Exercises Series N°1

Exercise 1

Comparison between electrostatic force and gravitational force in the hydrogen atom

Given the gravitational constant $G = 6,7 \cdot 10^{-11} \text{SI}$ and the first Bohr radius of the atom $a_0 = 0,53 \cdot 10^{-10} \text{m}$.

In the hydrogen atom, an electron (charge $-e$) describes a circular orbit of radius a_0 around a nucleus consisting of a proton (charge $+e$). The aim is to compare the electrostatic (F_e) and gravitational (F_g) forces between these two particles.

Particules	Charge	Masse
proton	$+ 1,62 \cdot 10^{-19} \text{ C}$	$1672 \cdot 10^{-30} \text{ kg}$
électron	$- 1,62 \cdot 10^{-19} \text{ C}$	$0,911 \cdot 10^{-30} \text{ kg}$

Exercise 2:

Three point charges lie along the x axis as shown in figure .1. The positive charge $q_1=15\mu\text{C}$ is at $x=2 \text{ m}$, the positive charge $q_2=6\mu\text{C}$ is at origin, and the resultant force acting on q_3 is **zero**. What is the x coordinating of q_3 ?

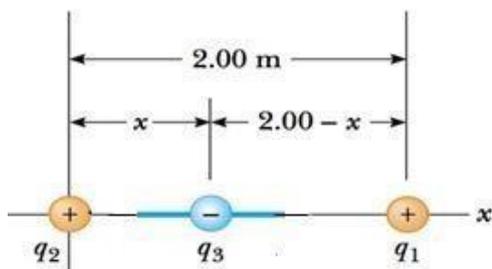


Figure1

Exercise3 : Three charges are placed on three corners of a triangle, as shown in the figure 2.

a) Find the resultant force exerted on q_0 .

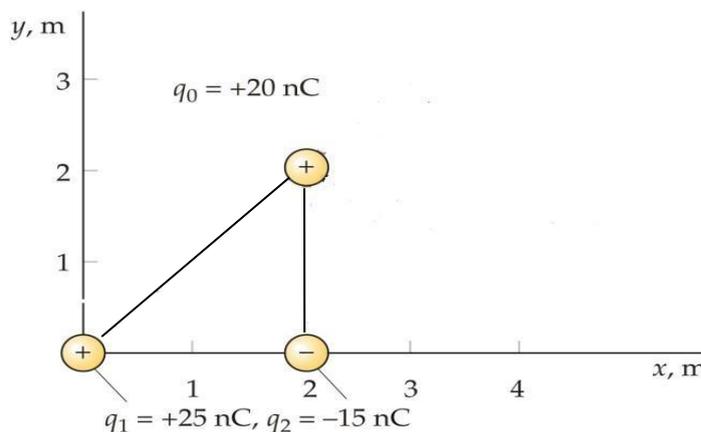


Figure.2