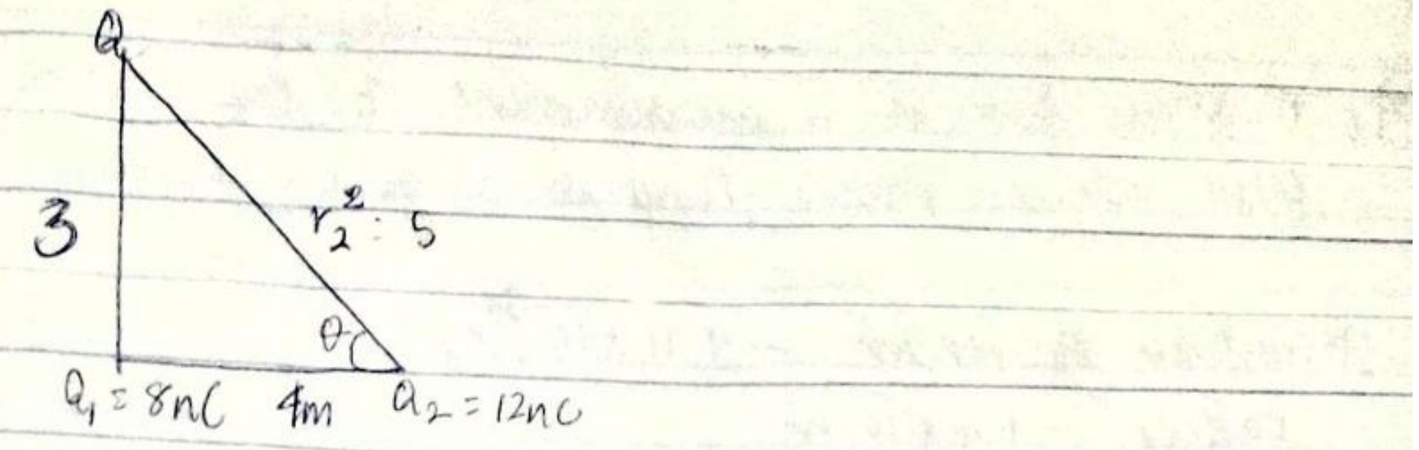
6. a It's a basic rule of physics (Faraday's law) that a changing magnetic field produces electricity. So a guitar string will produce electricity only for as long as the magnetic field is changing. In other words, for only as long as the metal string is moving. Once the string stops vibrating the sound stops.

b. 1. $\xi = -N \frac{d(BA\cos\theta)}{dt}$



$r_2^2 = 3^2 + 4^2$

$r_2 = 5m.$

$\theta = \sin^{-1}\left(\frac{3}{5}\right)$

$\theta = 36.87$

$E_1 = \frac{kq_1}{r_1^2} = \frac{9\times10^9 \times 8\times10^{-9}}{3^2}$

$E_1 = 8\ N/C$

$E_2 = \frac{kq_2}{r_2^2} = \frac{9\times10^9 \times 12\times10^{-9}}{5^2}$

$E_2 = 4.32\ N/C$

Vector	Angle	X-Component	Y-Component
$E_1 = 8N/C$	90	$E_1x = 8\cos90$	$E_1y = 8\sin90$
		$E_1x = 8$	$E_1y = 0$
$E_2 = 4.32\ N/C$	36.87	$E_2x = 4.32\cos36.87$	$E_2y = 4.32\sin36.87$
		$E_2x = 3.46$	$E_2y = 2.59$
		11.46 N/C	2.59.

$E = \sqrt{(11.46)^2 + (2.59)^2} = \sqrt{131.3316 + 6.7081}$

$E = 11.75\ N/C$

$E_2 = 12 \angle 0$

$E = \sqrt{13.449^2 + 0^2}$

$E = 13.449 \text{ V}$

4a. Magnetic flux is a measurement of the total magnetic field which passes through a given area.

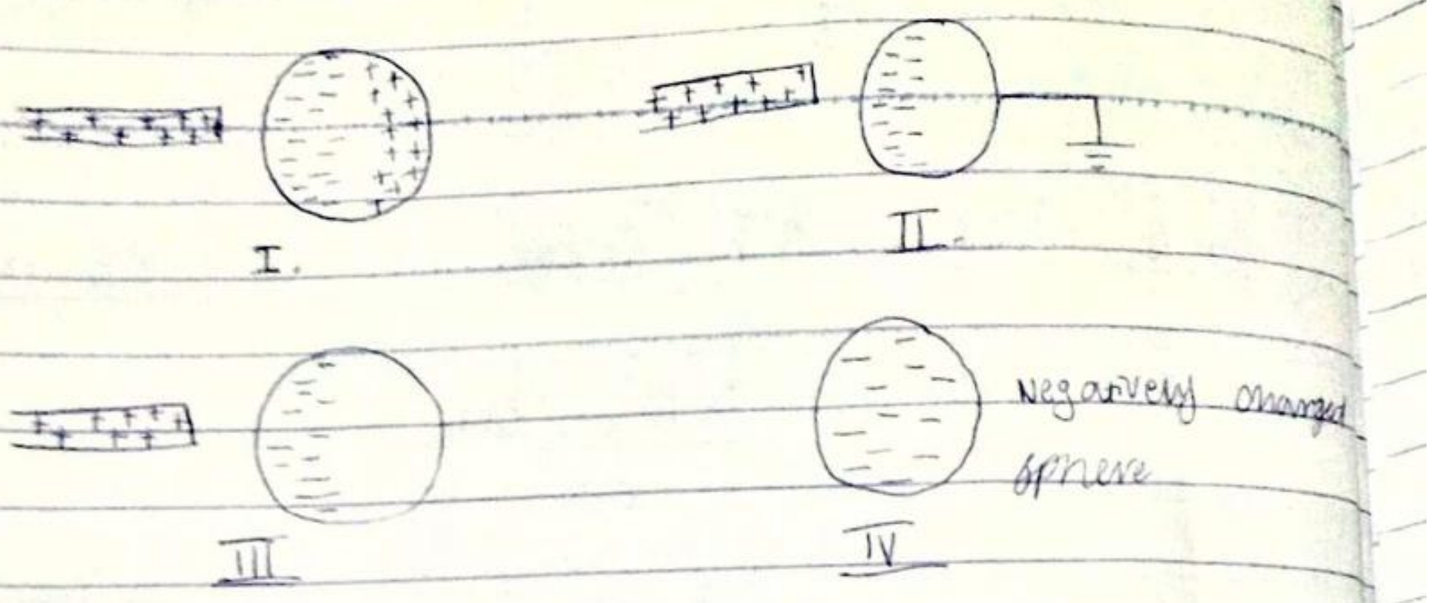
b. rest mass of electron - 9.11×10^{-31} kg
radius - 1.4×10^{-7} m
magnetic field - 3.5×10^{-1} weber $/m^2$

$$w = \frac{qB}{m}$$

VICTOR SIMON ILIYA
COMPUTER ENGINEERING
M/ENG/02/025
PHY 102

COVID-19 Holiday assignment

1.a.



b. Combined charge = $5.0 \times 10^{-5}C$

$f = 1.0N$

$r = 2.0m$

$q_1 + q_2 = 5.0 \times 10^{-5}C$

$F = \frac{kq_1q_2}{r^2}$; $1.0 = \frac{8.99 \times 10^9 \times q_1q_2}{2^2}$

$4 = 8.99 \times 10^9 \times q_1q_2$

$q_1q_2 = 4.449 \times 10^{-10}$

$q_1 + q_2 = 5.0 \times 10^{-5}C$; $q_1 = 5.0 \times 10^{-5} - q_2$

$(5.0 \times 10^{-5} - q_2)q_2 = 4.449 \times 10^{-10}$

$5.0 \times 10^{-5}q_2 - q_2^2 = 4.449 \times 10^{-10}$; $q_2^2 - 5.0 \times 10^{-5}q_2 = -4.449 \times 10^{-10}$

$q_2^2 - 5.0 \times 10^{-5}q_2 + 4.449 \times 10^{-10} = 0$

$q_2 = 1.158 \times 10^{-5}$ or 3.842×10^{-5}.

$q_1 = 5.0 \times 10^{-5} - 1.158 \times 10^{-5}$ or $5.0 \times 10^{-5} - 3.842 \times 10^{-5}$

$\therefore q_1 = 3.842 \times 10^{-5}$ or 1.158×10^{-5}