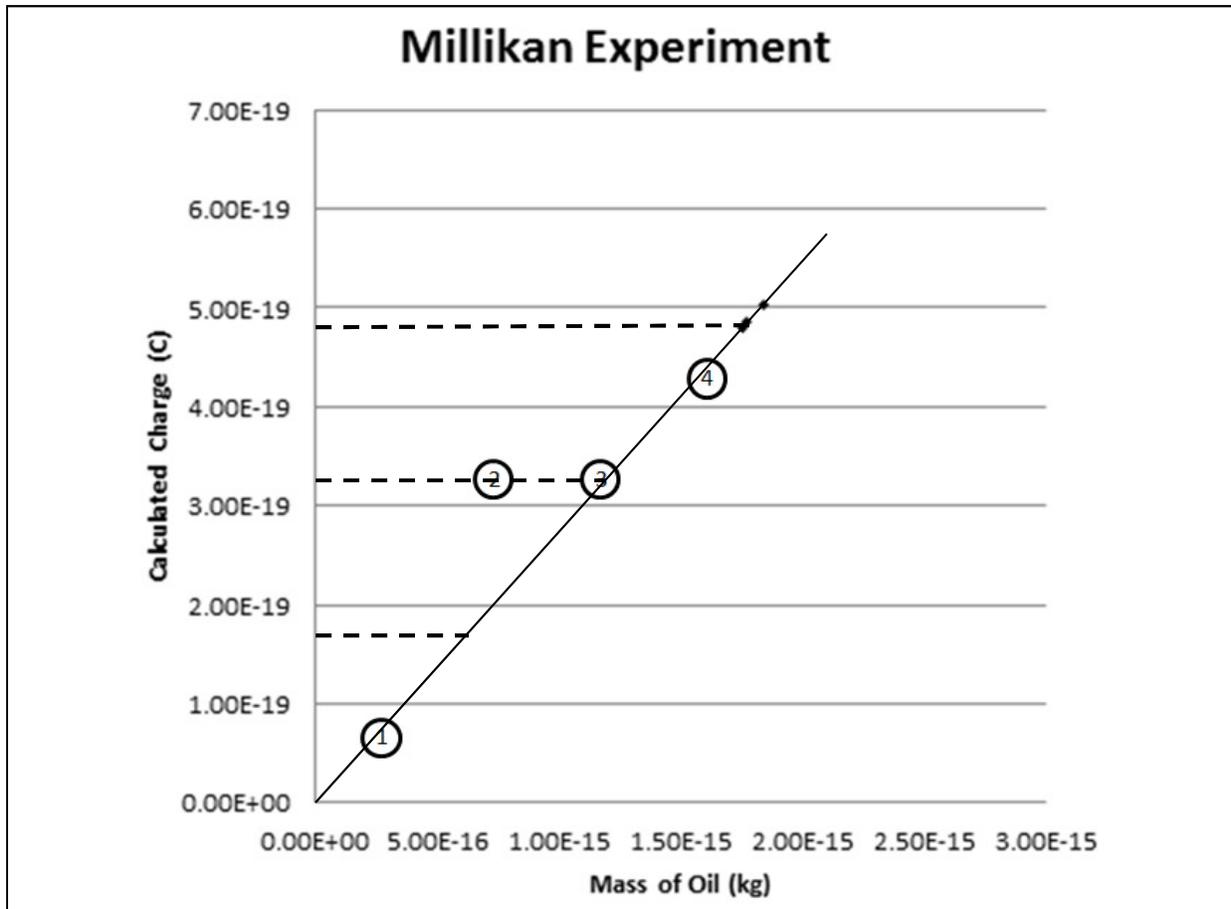First Name:_____   Last Name:_____

<u>*L03 - FQ – Mass Spectrometers and Millikan's Experiment*</u> – *ANSWER KEY*

Use the following information to answer Q1:

Millikan Experiment

Q1: What is the most probable location for data collected in a Millikan-style experiment?

a. Location **1**
b. Location **2**
c. Location **3** *(circled)*
d. Location **4**

Linear relationship.

$$mg = q|\vec{E}| \quad \text{or} \quad q = \frac{g}{|\vec{E}|}m + 0 \quad \text{(in y=mx+b format)}$$

So no y-intercept. Also since charge is quantized, the only options are ones that are equal to ne, where n in an integer and e is the elementary charge (1.60×10^{-19} C).

Use the following information to answer Q2:

Mass Spectrometer Equation Configurations

1 - $q\Delta V = \frac{1}{2}mv^2$ 2 - $q|\vec{E}| = \frac{1}{2}mv^2$

3 - $q\Delta V = qv|\vec{B}|$ 4 - $q|\vec{E}| = qv|\vec{B}|$

5 - $qv|\vec{B}| = \frac{mv^2}{r}$ 6 - $q|\vec{E}| = \frac{mv^2}{r}$

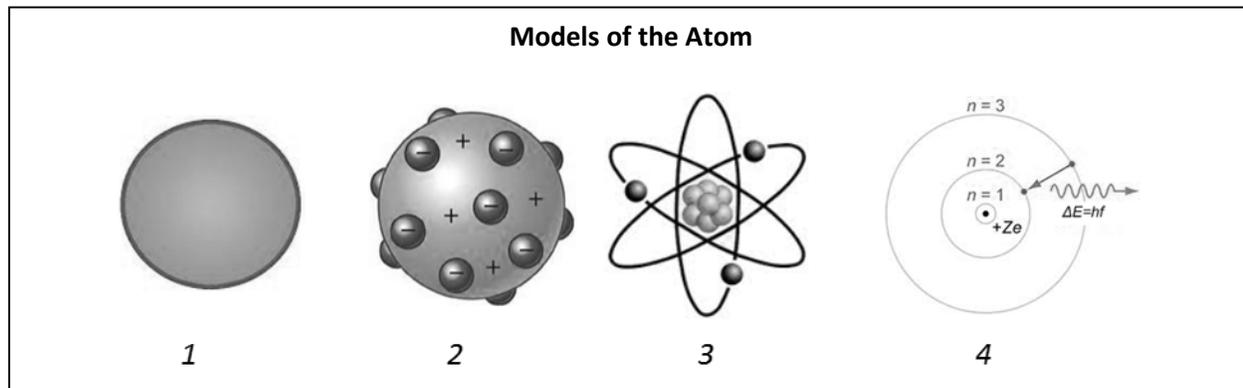**Q2:** Which equation configurations would be used for each of the various stages?

_____ _____ _____

Acceleration **Velocity** **Detection**
Plates **Selector** **Chamber**

*(Record your **three digit** answer in the Numerical Response boxes below)*

1	4	5	

Use the following information to answer Q3:

Models of the Atom

1 2 3 4

Q3: Using the information above, assign the model to the person that proposed the model:

_____ _____ _____ _____

Bohr **Dalton** **Rutherford** **J.J. Thomson**

*(Record your **four digit** answer in the Numerical Response boxes below)*

4	1	3	2