

Test for Mass Spectroscopy activity

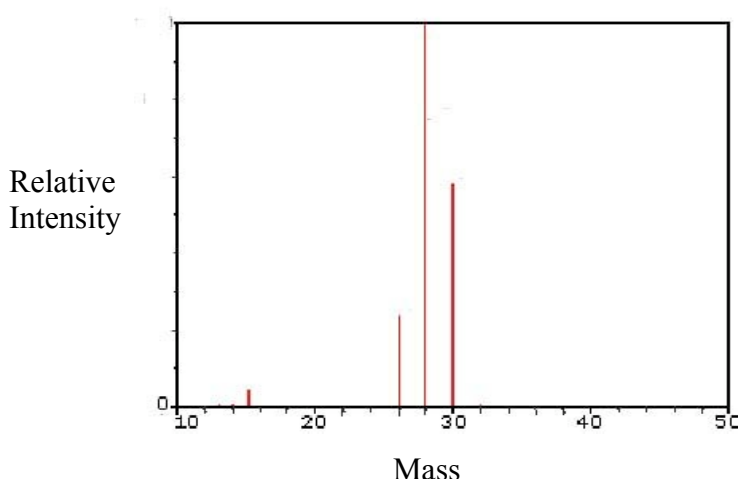
Name _____ Date _____
Teacher _____ Class _____

1. The ability of a mass spectrometer to separate particles by mass is based on the principle that:

- the motion of charged particles can be affected by a magnetic field;
- the motion of charged particles can be affected by a gravitational field;
- the motion of charged particles can be affected by an electric field.

2. While running a mass spectrometer, the following mass spectrum of a gaseous compound is produced.

(graph adapted from: <http://www.cem.msu.edu/~reusch/VirtualText4/Questions/Spectroscopy/masspec3.htm>)



The "relative intensity" is related to the number of ions arriving at the mass spectrometer's detector: the more abundant the ion, the greater the relative intensity.

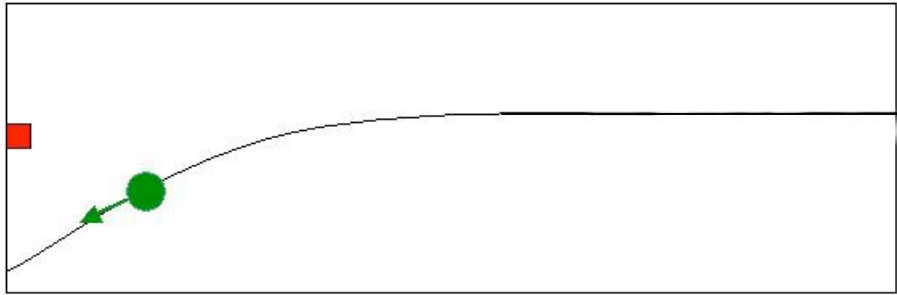
2a. What is the mass of the most common ion?

2b. What are masses of the other ions?

3. The detector in a mass spectrometer would NOT measure the mass-to-charge ratios of substances that:

- a. are positively charged
- b. are ions
- c. have no charge

4. The picture below shows a charged particle moving through a chamber in a mass spectrometer. As the particle enters the magnetic field, the field causes the particle to move in a curved path as shown by the black line. The path currently shows a particle curving below the red sensor [the filled in box] on the left side of the chamber.



4a. Would a technician need to increase or decrease the strength of the magnetic field in the mass spectrometer to get the particle in the picture to hit the sensor.

4b. If particles with half of the mass of the particle shown in the illustration above were placed in the mass spectrometer but all other settings were equal predict approximately where the particle would hit the wall. Explain your prediction.