Test yourself: Chapter 2

1. An isotope of a neutral gallium atom has the symbol $^{69}_{31}\text{Ga}$. Which particles are present in one atom of this isotope?
   
   A. 31 protons, 69 neutrons and 31 electrons  
   B. 31 protons, 38 neutrons and 31 electrons  
   C. 31 protons, 38 neutrons and 38 electrons  
   D. 69 protons, 38 neutrons and 69 electrons

2. What are the relative masses of an electron, a proton and a neutron?
   
   A. proton = 1, electron = $\frac{1}{183}$, neutron = 0  
   B. proton = 1, electron = $\frac{1}{183}$, neutron = 1  
   C. proton = 1, electron = 1, neutron = 0  
   D. proton = 1, electron = $\frac{1}{1836}$, neutron = 1

3. Which one of these statements best describes isotopes?
   
   A. Atoms of the same element with different numbers of neutrons  
   B. Atoms of different elements with different numbers of nucleons  
   C. Atoms of the same element with different numbers of electrons  
   D. Atoms of different elements with the same number of nucleons
4 Which one of these statements is correct?

A If an element occurs naturally it only has a single isotope

B Relative isotopic masses are always whole numbers

C The accurate relative atomic mass of an atom of carbon-12 is 12.001

D The relative atomic mass of an element is the mass of an atom of the element compared with the mass of an atom of carbon-12

5 Which one of the following values is the correct relative molecular mass of iron(III) sulfate, Fe$_2$(SO$_4$)$_3$? (A, values: Fe = 55.8, S = 32.1, O = 16.0)

A 399.9

B 376.2

C 344.1

D 303.8

6 An electron beam is deflected at a greater angle than a proton beam when both are exposed to the same strong electric field. Why is this?

A An electron has a negative charge while a proton has a positive charge

B An electron has a much larger mass than a proton

C An electron has a much smaller mass than a proton

D An electron has more electrical energy than a proton
7. A sample of magnesium obtained from a meteorite has the isotopic composition, $^{24}\text{Mg}$ (74%), $^{25}\text{Mg}$ (10%), $^{26}\text{Mg}$ (16%). Which one of the following is most likely to be the correct relative atomic mass of the sample of magnesium, to 1 decimal place?

A. 24.2  
B. 24.3  
C. 24.4  
D. 24.5

8. The number of electrons in the phosphide ion $^{31}\text{P}^{3-}$ is:

A. 12  
B. 15  
C. 18  
D. 28

9. Which one of these statements about the mass spectrum for krypton, shown below, is correct?

A. The vertical axis shows the mass of the ions produced  
B. The horizontal axis shows the mass/charge ratio of the ions produced  
C. The accurate relative atomic mass of krypton is 85.1  
D. There are five isotopes of krypton

![Mass Spectrum Diagram]
Chlorine has two isotopes, $^{35}\text{Cl}$ and $^{37}\text{Cl}$. A chlorine molecule has the formula \( \text{Cl}_2 \). Deduce the maximum number of different chlorine molecule ions, \( \text{Cl}_2^+ \), that can appear in a mass spectrum of chlorine.

A 1
B 2
C 3
D 4