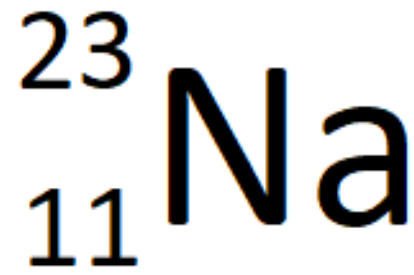


Paper 1

Chapter 3 — Atomic Structure

Sodium Atom



What is the mass number?

What is the atomic number?

How many protons?

How many neutrons?

How many electrons?

Handling Radioactive Materials

What is the difference between radioactive contamination and irradiation?

Name 3 precautions that should be taken when handling radioactive materials.

Ionising Radiation

1.) Draw arrows to show how far the radiation will penetrate.

2.) Which radiation is...

...2 protons and 2 neutrons

...A high speed electron from the nucleus

...An electromagnetic wave

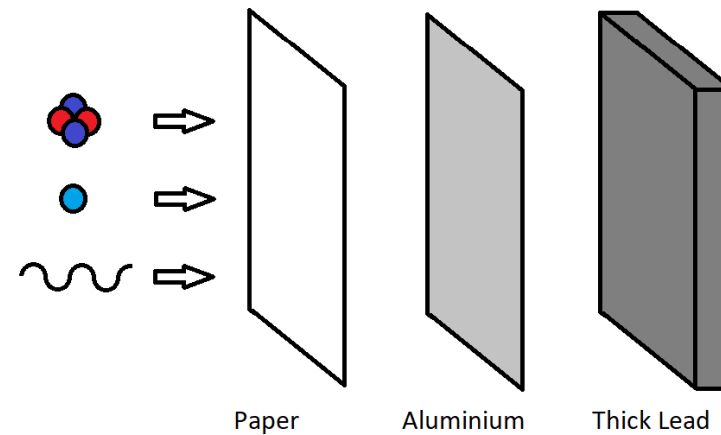
3.) Which radiation matches the properties

Most ionising

Least ionising

Highest range in air

Lowest range in air



Alpha Scattering

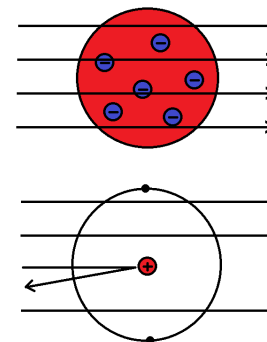
Discovery of electrons led to the _____ model.

Rutherford fired _____ at thin gold and some deflected or bounced back.

Alpha particles can be detected with a _____ tube.

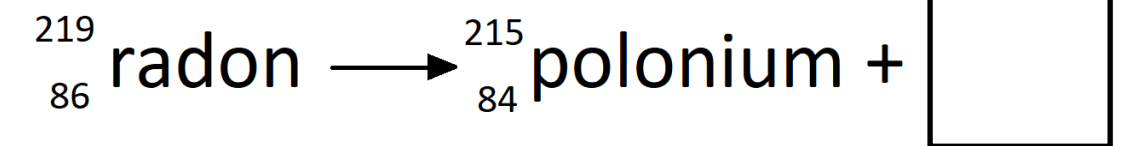
The new evidence changed the model to the _____ model.

In the new model the _____ is concentrated in the nucleus and the nucleus is _____.

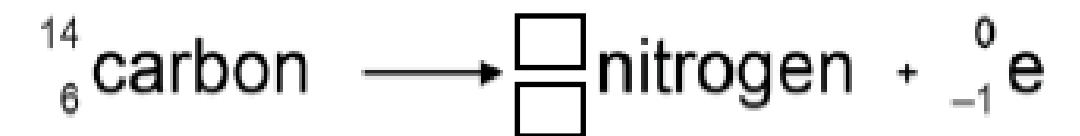


Nuclear Equations

Complete the first equation for the alpha emission

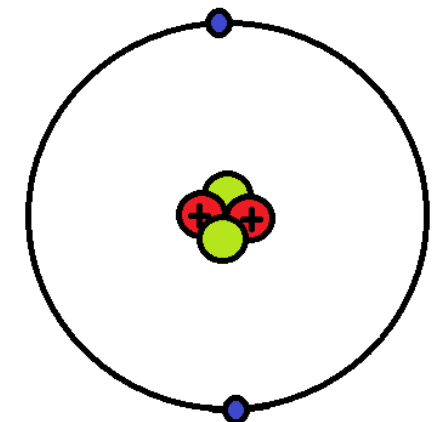


Fill in the mass and atomic numbers on the nitrogen



Draw 4 Label Arrows and Fill in the Table

	Protons	Neutrons	Electrons	Nucleus
Mass Number				
Atomic Number				
Neutron Number				
Charge				
Ion or Atom				
Name				



Physics Only

Atoms are very small, having a radius of about _____ metres.

The radius of a nucleus is less than _____ of the radius of an atom.

Most of the mass of an atom is concentrated in the _____.

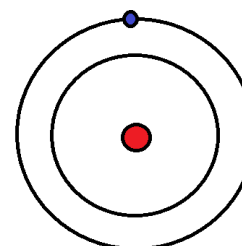
Atoms of an element with different mass numbers are called _____.

Charged atoms are called _____.

Energy Levels

Why is the hydrogen electron at a higher energy level (further from the nucleus)?

What would happen if it moved closer to the nucleus?

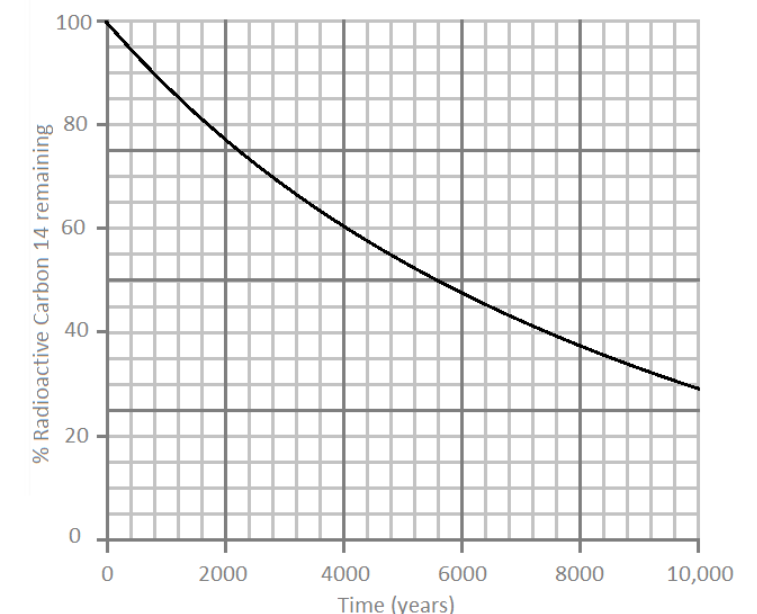


Half Life

Radioactive decay is a _____ process.

What is the half life of the carbon 14 isotope?

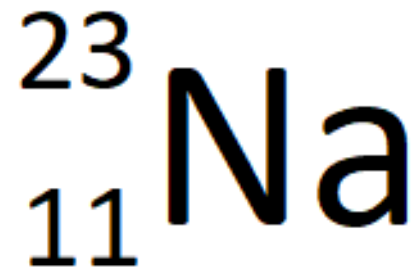
What % of the carbon 14 atoms will remain after 3 half lives have passed?



Paper 1

Chapter 3 — Atomic Structure

Sodium Atom



What is the mass number?

23

What is the atomic number?

11

How many protons?

11

How many neutrons?

12

How many electrons? 11

Handling Radioactive Materials

What is the difference between radioactive contamination and irradiation?

Contamination is unwanted radioactive materials on an object/person

Irradiation is exposure to nuclear radiation

Name 3 precautions that should be taken when handling radioactive materials.

Keep far away e.g. use tongs

Limit exposure time

Wear protective clothing e.g. disposable gloves

Store materials in lead lined containers

Ionising Radiation

1.) Draw arrows to show how far the radiation will penetrate.

2.) Which radiation is...

...2 protons and 2 neutrons

...A high speed electron from the nucleus

...An electromagnetic wave

3.) Which radiation matches the properties

Most ionising

Alpha

Least ionising

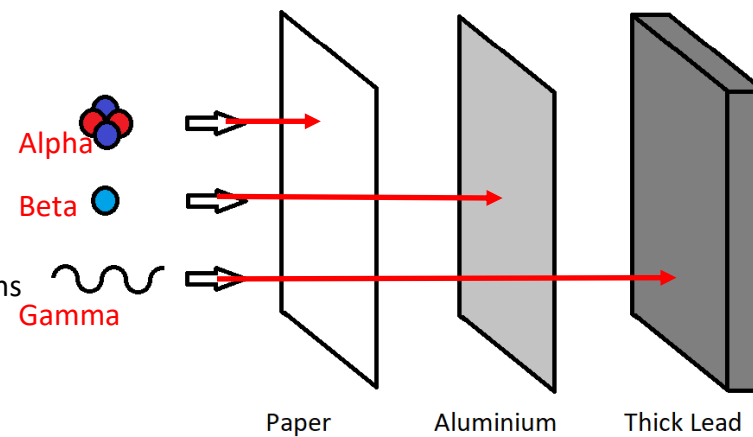
Gamma

Highest range in air

Gamma

Lowest range in air

Alpha



Alpha Scattering

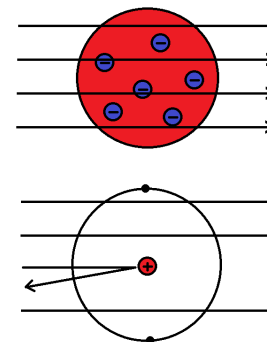
Discovery of electrons led to the plum pudding model.

Rutherford fired alpha particles at thin gold and some deflected or bounced back.

Alpha particles can be detected with a Geiger Muller tube.

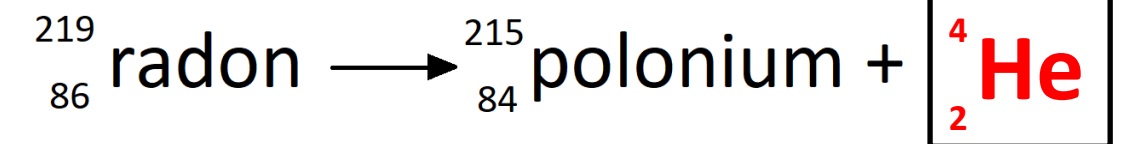
The new evidence changed the model to the Nuclear model.

In the new model the mass is concentrated in the nucleus and the nucleus is charged.

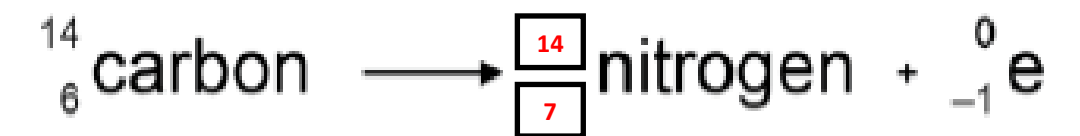


Nuclear Equations

Complete the first equation for the alpha emission

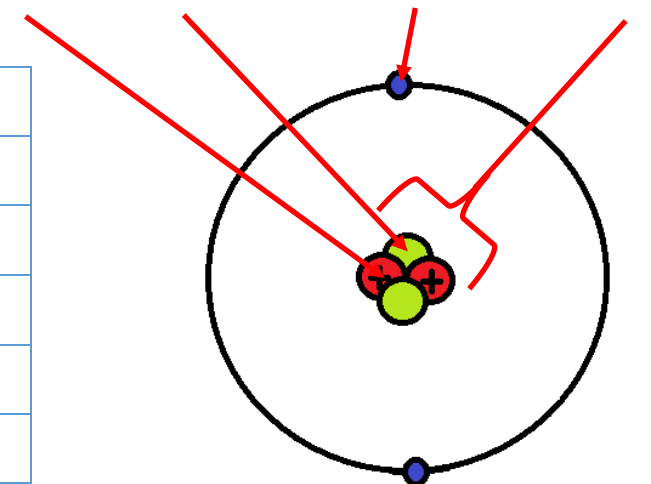


Fill in the mass and atomic numbers on the nitrogen



Draw 4 Label Arrows and Fill in the Table

	Protons	Neutrons	Electrons	Nucleus
Mass Number	4			
Atomic Number	2			
Neutron Number	2			
Charge	0			
Ion or Atom	Atom			
Name	Helium			



Physics Only

Atoms are very small, having a radius of about 1×10^{-10} metres.

The radius of a nucleus is less than 1/10,000 of the radius of an atom.

Most of the mass of an atom is concentrated in the nucleus.

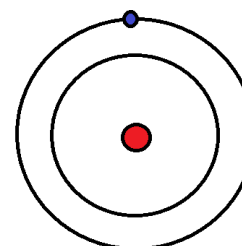
Atoms of an element with different mass numbers are called isotopes.

Charged atoms are called ions.

Energy Levels

Why is the hydrogen electron at a higher energy level (further from the nucleus)? The atom has absorbed electromagnetic radiation.

What would happen if it moved closer to the nucleus? The atom would emit electromagnetic radiation.



Half Life

Radioactive decay is a random process.

What is the half life of the carbon 14 isotope?

5600 years

What % of the carbon 14 atoms will remain after 3 half lives have passed

12.5%

