Activity # 2

10

Name _____

Date _____

Date due _____

Assignment on Atomic Structure

NOTE: This assignment is based on material on the Power Point called "Atomic Structure", as well as pages 167-173 in the Science Probe textbook.

1. In the following table, name the 3 major particles in the atom, state where they are located (in the nucleus or on the outside), state their relative mass compared to a proton (assume mass of a proton = 1) and their charge.

Particle	Location	Mass (*Proton = 1*)	Charge

2. List the four main points in John Dalton's **atomic theory**.

   1. _____
   2. _____
   3. _____
   4. _____

3. Explain the difference between an **atom** of an element and a **molecule** of a compound.

   _____

   _____

4. What is meant by the **atomic number** of an element? _____

_____

5. Where can the atomic number of an element be found on the periodic table? _____

6. List the atomic number and the number of protons in an atom of each of the following elements:

Element	Atomic Number	# of Protons
Hydrogen (H)		
Lithium (Li)		
Nitrogen (N)		
Copper (Cu)		
Lead (Pb)		
Radon (Rn)		
Uranium (U)		

7. **Isotopes** of an element are two different forms which have the same number of _____

and _____, but with different numbers of _____.

8. Are all atoms of hydrogen exactly the same as one another? _____

Explain your answer. _____

_____

9. What is meant by a **radioactive** isotope of an element? _____

_____

10. What are the following radioactive isotopes used for?

Cobalt-60 - _____

Uranium 235 - _____

Hydrogen 2 (Deuterium) _____

11. Why should you avoid contact with radioactive isotopes? _____

_____

12. The **atomic** _____ of an element is the average mass of the isotopes which occur in nature.

13. Where is atomic mass found on the Periodic Table? _____

_____

14. Using the Periodic Table, give the Atomic Number (# of Protons) and the Atomic Mass of each of the following elements.

Element	Atomic Number	Atomic Mass
Helium (He)		
Carbon (C)		
Chlorine (Cl)		
Iron (Fe)		
Lead (Pb)		
Mercury (Hg)		
Plutonium (Pu)		

15. In a **neutral atom**, the number of **electrons** is always equal to the number of

_____ or the _____ number.

16. According to the model of the atom proposed by Neils Bohr, electrons move around the atom

in _____ or _____. When one orbit is

filled, the electrons start filling the _____ orbit.

17. The first orbit holds _____ electrons.

The second orbit holds _____ electrons.

The third orbit holds _____ electrons.

The fourth orbit holds _____ electrons.

18. Give the total number of electrons and the number of electrons in each orbit for each of the following elements: (The first one is done as an example.)

Element	Total # of electrons	Electrons in Level 1	Electrons in Level 2	Electrons in Level 3	Electrons in Level 4
Chlorine (Cl)	17	2	8	7	
Carbon (C)					
Neon (Ne)				0	
Calcium (Ca)					
Sodium (Na)					
Aluminum (Al)					
Nitrogen (N)					
Lithium (Li)					
Argon (Ar)					
Magnesium (Mg)					
Potassium (K)					
Iron (Fe)					
Bromine (Br)					
Krypton (Kr)					

19. Draw the **Bohr models** for neutral atoms of each of the following elements.

a) Hydrogen

b) Helium

c) Carbon

d) Oxygen

e) Neon

f) Sodium

g) Chlorine

h) Argon

i) Potassium

20. According to Bohr, when a sample of an element is energized by heat or electricity, the electrons jump to _____ orbits. When they jump back down to lower orbits, they give off the energy in the form of _____. The amount of energy released in each jump corresponds to a certain _____ of light. The pattern of different colours of light given off is called the _____ for that element and can be seen through a device called a **spectroscope**. Because every element has its own set of electrons and orbits, the spectrum given off by each element will be _____ from that of any other element. What can this be used for? _____

_____

21. Given the isotope: ^{210}Pb, find:

a) the atomic number..... _____
b) the # of protons ..... _____
c) the # of neutrons ..... _____
d) the # of electrons if this is a neutral atom ..... _____
e) the mass #..... _____

f) find the atomic mass of Pb on the Periodic Table. _____. Why is this different than the mass number of this isotope? _____

_____

22. Given the isotope: ^{139}Ba, find:

a) the atomic number..... _____
b) the # of protons ..... _____
c) the # of neutrons ..... _____
d) the # of electrons if this is a neutral atom ..... _____
e) the mass #..... _____

23. Given the isotope: ^{238}Np, find:

a) the atomic number..... _____
b) the # of protons ..... _____
c) the # of neutrons ..... _____
d) the # of electrons if this is a neutral atom ..... _____
e) the mass #..... _____

24. Given the isotope: $^{266}_{109}?$, find:

a) the atomic number..... _____
b) the name of the element ..... _____
b) the # of protons ..... _____
c) the # of neutrons ..... _____
d) the # of electrons if this is a neutral atom ..... _____
e) the mass #..... _____

25. Given the isotope: $^{232}_{90}?$, find:

a) the atomic number..... _____
b) the symbol of the element ..... _____
c) the name of the element ..... _____
d) the # of protons ..... _____
e) the # of neutrons ..... _____
f) the # of electrons if this is a neutral atom ..... _____
g) the mass #..... _____

26. Given the isotope: $^{199}_{80}?$, find:

a) the atomic number..... _____
b) the symbol of the element ..... _____
c) the name of the element ..... _____
d) the # of protons ..... _____
e) the # of neutrons ..... _____
f) the # of electrons if this is a neutral atom ..... _____
g) the mass #..... _____

27. Given the isotope: $^{40}_{18}?$, find:

a) the atomic number..... _____
b) the symbol of the element ..... _____
c) the name of the element ..... _____
d) the # of protons ..... _____
e) the # of neutrons ..... _____
f) the # of electrons if this is a neutral atom ..... _____
g) the mass #..... _____

28. An isotope of an element has 76 protons and 116 neutrons

a) what is the atomic number? ..... _____
b) what is the name of the element? ..... _____
c) what is the mass number of this isotope? ..... _____
d) if the atom is neutral, how many electrons?.... _____
e) give the nuclear notation (eg $^{139}_{56}Ba$ is the nuclear notation for Barium-139)

_____

29. The isotope Plutonium-239 has _____ protons and _____ neutrons and the mass # = _____

30. The isotope Cesium-133 has _____ protons and _____ neutrons and the mass # = _____