Name:

Study guide - Ch 4, 25, 5

1. Match the scientist to his contribution(s).

Millikan

Rutherford ` Goldstein

Chadwick

Thomson

* cathode ray tube experiment; discovered electrons
* discovered the neutron
* mass to charge ratio of the electron
* gold foil experiment
* discovered the proton

1. What is an atom?
2. What are protons, neutrons and electrons?
3. What is an elements atomic number?
4. What is an elements mass number?
5. What does 75 represent in Arsenic-75?
6. Fill in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Element** | **# of protons** | **# of electrons** | **# of neutrons** | **Atomic #** | **Mass #** |
| **Manganese** | 25 |  | 30 |  |  |
| **Sodium** |  | 11 | 12 |  |  |
| **Yttrium** |  |  |  | 39 | 89 |
| **Actinium** |  |  |  |  | 227 |

1. State the numbers of protons, neutrons and electrons in the following:

a. 80Br

b. 24Mg

c. 12C

1. What is an isotope?
2. What is average atomic mass?
3. What is the difference between a chemical rxn and a nuclear rxn.
4. What are the 3 types of radiation?
5. What will stop each type of radiation?
6. What is radioactive decay?
7. Write the symbols for an alpha particle, beta particle, gamma ray, neutron, proton and positron.

***Write the equations for the following processes (#18-21):***

1. The alpha decay of iridium-174
2. The beta decay of platinum-199
3. Positron emission from sulfur-31
4. Krypton-76 undergoes electron capture
5. Will gamma emission lead to a transmutation?
6. What is artificial transmutation? Give an example. (hint: look in your textbook)
7. If the half-life for the radioactive decay of zirconium-84 is 26 minutes and I start with a 175 gram sample, how much will be left over after 104 minutes?
8. 10 grams of Bismuth-218 decay to 0.625 grams in two hours. What is the half-life of this isotope?
9. Define fusion and fission.
10. Why is it difficult to make a fusion reaction occur?
11. What is the Bohr Model of the atom?
12. What is the electromagnetic radiation spectrum?
13. What is a quantum? Photon?
14. Which color of visible light has the longest wavelength? Shortest? Longest frequency? Shortest?
15. What is frequency? Wavelength?
16. What is the frequency of a light photon that has a wavelength 725 nm?
17. What is the wavelength of light with a frequency of 1.50 x 1013 s-1?
18. How are wavelength and frequency related?
19. What is the energy of a radio photon that has a frequency of 2.6 x 107 s-1?

(remember E=hν where h = 6.626 x 10-34 J⋅s)

1. hat are atomic emission spectrums?
2. What happens to electrons to cause emission spectra? Include ground state and excited state.
3. How are energy and frequency related?
4. What are Lyman series, Balmer series and Paschen series? Know how to read the Bohr model of hydrogen on the EOC packet.
5. What is the Heisenberg uncertainty?
6. What is the quantum mechanical model of the atom?
7. Fill in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy Level** | **Sublevels** | **# of orbitals** | **# of electrons** |
| **1** |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |

1. How many sublevels are contained in the 3rd energy level?
2. What are the letters representing the sublevels contained in the 3rdenergy level?
3. What is the maximum number of electrons that can be contained in the 3rd energy level?
4. Explain Hund’s rule, Aufbau principle & the Pauli Exclusion Principle.
5. Write the orbital notation for the following:

Na-

Ne-

S-

1. Write the electron configurations (long form) for the following:

P-

Fe-

Ca-

1. Write the electron configurations (abbreviated form) for the following:

Au-

Ag-

Al-