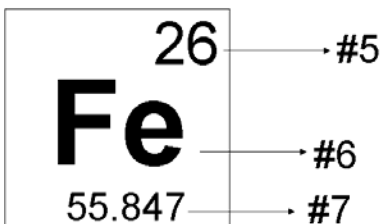


General Chemistry
Mr. MacGillivray
Atomic Structure Worksheet

1. The number of protons in the nucleus of an atom of a particular element is called the _____ of that element.
2. In a neutral element, the number of protons must equal the number of _____.
3. The mass number of an atom is the sum of the _____ and the _____ in the nucleus of an atom.
4. Atoms of an element that have the same number of protons but different numbers of neutrons are said to be different _____ of that element.



5. The number "26" is the _____ of Fe.
6. The symbol "Fe" stands for the name of this element: _____.
7. The number "55.847" is the _____ of the element Fe.
8. There are three isotopes of hydrogen: H-1, H-2, and H-3. The average mass of a hydrogen atom is 1.0079 (check this on the periodic table). Which of these three isotopes above is probably the most common? Why?
9. Examine the abundance of Fe isotopes:
5.8% Fe-54
91.8% Fe-56
2.1% of Fe-57
0.28% of Fe-58
Look at the atomic mass of Fe again. Why do you think it is so close to 56 amu?

II. Fill in the table below. All atoms are neutral.

| | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Isotope symbol | $^{54}_{26}\text{Fe}$ | $^{56}_{26}\text{Fe}$ | $^{57}_{26}\text{Fe}$ | $^{58}_{26}\text{Fe}$ |
| Alternate symbol | Fe-54 | Fe-56 | | |
| # of protons | 26 | | | |
| # of neutrons | | 30 | | |
| Mass # | | | | 58 |

III. Fill in the table below. All atoms are neutral.

| Element name | Symbol | p ⁺ | n ⁰ | e ⁻ | mass number | Z |
|--------------|-----------------------|----------------|----------------|----------------|-------------|---|
| | | 15 | 16 | | | |
| | $^{238}_{92}\text{U}$ | | | | | |
| | | 6 | 8 | | | |
| | | 7 | 7 | | | |
| | | | | 92 | 235 | |
| | $^1_1?$ | | | | | |
| | $^2_1?$ | | | | | |
| | $^3_1?$ | | | | | |

General Chemistry
Mr. MacGillivray
Atomic Structure Worksheet

1. The number of protons in the nucleus of an atom of a particular element is called the atomic number of that element.
2. In a neutral element, the number of protons must equal the number of electrons.
3. The mass number of an atom is the sum of the protons and the neutrons in the nucleus of an atom.
4. Atoms of an element that have the same number of protons but different numbers of neutrons are said to be different isotopes of that element.

| | |
|-----------|------|
| 26 | • #5 |
| Fe | • #6 |
| 55.847 | • #7 |

5. The number "26" is the atomic # of Fe.
6. The symbol "Fe" stands for the name of this element: iron.
7. The number "55.847" is the atomic mass of the element Fe.
8. There are three isotopes of hydrogen: H-1, H-2, and H-3. The average mass of a hydrogen atom is 1.0079 (check this on the periodic table). Which of these three isotopes above is probably the most common? Why?

H-1, because the average mass of H atoms (1.0079) is closest to 1,
one.

9. Examine the abundance of Fe isotopes:
5.8% Fe-54
91.8% Fe-56
2.1% of Fe-57
0.28% of Fe-58

Look at the atomic mass of Fe again. Why do you think it is so close to 56 amu?

→ Because Fe-56 is the most abundant isotope.

II. Fill in the table below. All atoms are neutral.

| Isotope symbol | $^{54}_{26}\text{Fe}$ | $^{56}_{26}\text{Fe}$ | $^{57}_{26}\text{Fe}$ | $^{58}_{26}\text{Fe}$ |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Alternate symbol | Fe-54 | Fe-56 | Fe-57 | Fe-58 |
| # of protons | 26 | 26 | 26 | 26 |
| # of neutrons | 28 | 30 | 31 | 32 |
| Mass # | 54 | 56 | 57 | 58 |

z is the symbol for atomic number

III. Fill in the table below. All atoms are neutral.

| Element name | Symbol | p^+ | n^0 | e^- | mass number | z |
|--------------|-----------------------|-------|-------|-------|-------------|----|
| phosphorus | $^{31}_{15}\text{P}$ | 15 | 16 | 15 | 31 | 15 |
| uranium | $^{238}_{92}\text{U}$ | 92 | 146 | 92 | 238 | 92 |
| carbon | $^{14}_6\text{C}$ | 6 | 8 | 6 | 14 | 6 |
| nitrogen | $^{14}_7\text{N}$ | 7 | 7 | 7 | 14 | 7 |
| uranium | $^{235}_{92}\text{U}$ | 92 | 143 | 92 | 235 | 92 |
| hydrogen | ^1_1H | 1 | 0 | 1 | 1 | 1 |
| hydrogen | ^2_1H | 1 | 1 | 1 | 2 | 1 |
| hydrogen | ^3_1H | 1 | 2 | 1 | 3 | 1 |