

AIM | What are atomic weights?

25

You have learned that the atomic number is based on the number of protons or electrons of an atom. There is another method of describing atoms. This method uses the number of neutrons and protons. THE NUMBER OF NEUTRONS AND PROTONS OF AN ATOM IS CALLED ITS ATOMIC WEIGHT (MASS).

In the case of ATOMIC WEIGHT, the weight (or mass) is not given in grams or ounces. It is given in ATOMIC MASS UNITS (a.m.u.). You can figure out the atomic weight of an atom:

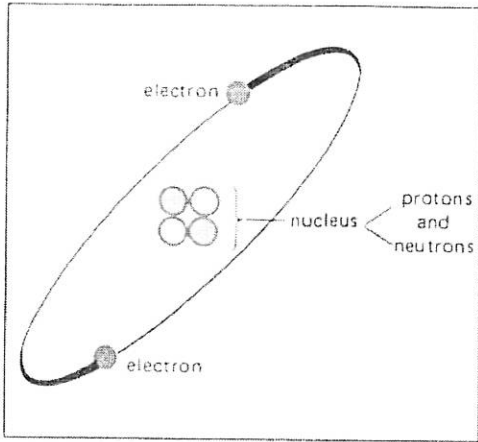
Each PROTON is given a weight of one.

Each NEUTRON is given the weight of one.

Atomic weight is the COMPARISON of the "weight" of one kind of atom with the "weight" of another kind of atom.

On pages 153 and 185 you will see the symbol description for sulfur (S). Its ATOMIC NUMBER is 16. Its ATOMIC WEIGHT is 32.06. But how can it be 32.06 and not exactly 32? After all, 16 protons plus 16 neutrons equals 32. Right — but.

A very small percentage of sulfur atoms have 17 neutrons. Therefore, these atoms raise the AVERAGE atomic weight of sulfur to 32.06.



A.

$$\text{NUCLEUS}$$

$$\text{PROTONS} + \text{NEUTRONS} = \text{ATOMIC WEIGHT}$$

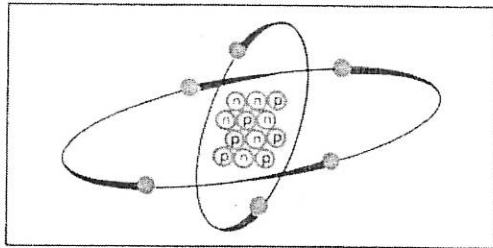
Each proton has a value of *one*.

Each neutron has a value of *one*.

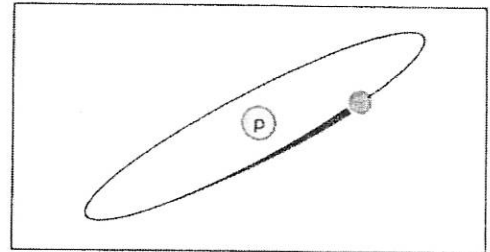
ATOMIC WEIGHT, PLEASE

- I. The diagrams below show six different atoms. Look at each one closely. Find the atomic weight of each atom. Write your answer in the space below the diagram.

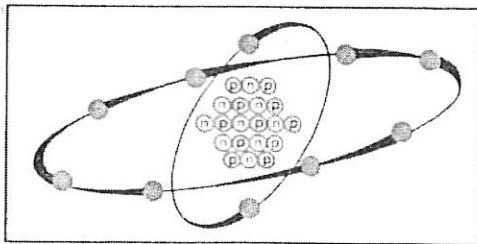
Remember: atomic weight = protons + neutrons



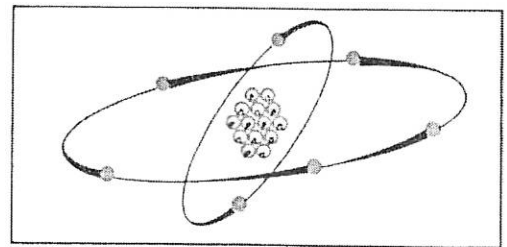
B. Atomic Weight _____



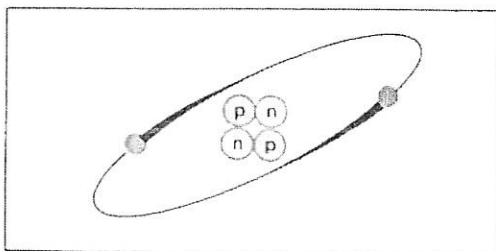
C. Atomic Weight _____



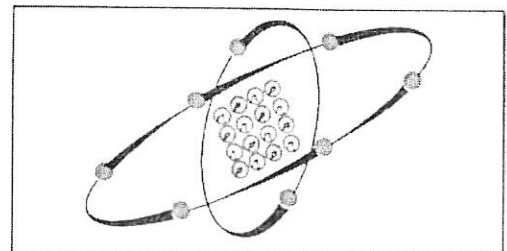
D. Atomic Weight _____



E. Atomic Weight _____



F. Atomic Weight _____



G. Atomic Weight _____

II. The table below lists fifteen different atoms. The number of protons and neutrons in each atom is also listed. Use that information to find the atomic weight of each of these elements. Write your answer in the last column.

Name of element	Number of protons	Number of neutrons	Atomic weight
1. cobalt	27	32	
2. zinc	30	35	
3. krypton	36	48	
4. hydrogen	1	0	
5. potassium	19	20	
6. gold	79	118	
7. arsenic	33	42	
8. sulfur	16	16	
9. iodine	53	74	
10. tungsten	74	110	
11. silver	47	61	
12. uranium	92	146	
13. lead	82	125	
14. calcium	20	20	
15. oxygen	8	8	

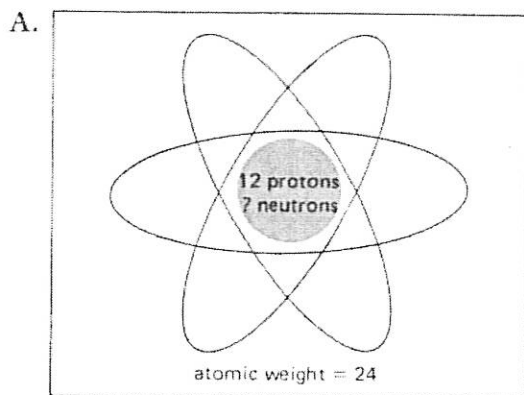
WHAT DO THE PICTURES SHOW?

Each picture below shows an atom. Some information is given about each atom. Use this information to answer the questions about each atom.

REMEMBER,

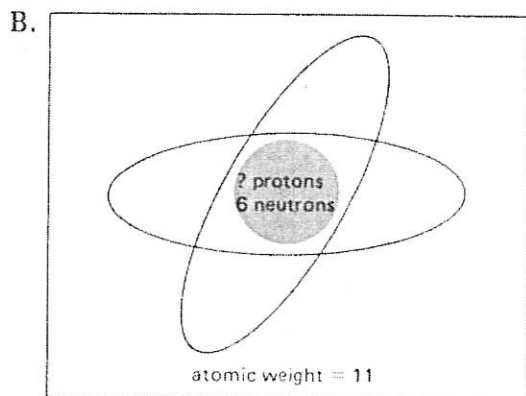
P rotons = _____ and
E lectrons = _____
N umber (atomic) = _____

protons + neutrons = atomic weight



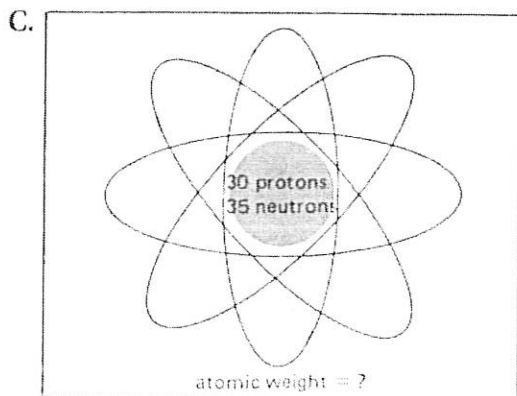
- A.
- How many neutrons does this atom have?

 - How many electrons? _____
 - What is the atomic number? _____
 - What is the name of this atom? _____
 - What is its symbol? _____



- B.
- How many protons does this atom have?

 - How many electrons? _____
 - What is the atomic number? _____
 - What is the name of this atom? _____
 - What is its symbol? _____



- C.
- What is the atomic weight of this atom?

 - How many electrons? _____
 - What is the atomic number? _____
 - What is the name of this atom? _____
 - What is its symbol? _____

MULTIPLE CHOICE In the space on the right, write the letter that best completes each sentence.

1. Atoms are made up of 1. _____
 - a) protons only.
 - b) protons and neutrons only.
 - c) protons, neutrons, and electrons.
2. A nucleus has 2. _____
 - a) protons, neutrons, and electrons.
 - b) protons and neutrons.
 - c) only electrons.
3. Hydrogen is the only atom that has no 3. _____
 - a) protons.
 - b) neutrons.
 - c) electrons.
4. An atomic weight equals 4. _____
 - a) protons plus electrons.
 - b) electrons plus neutrons.
 - c) protons plus neutrons.
5. Which of these atoms has the most protons? 5. _____
(Use the Periodic Table to find the answer.)
 - a) sodium
 - b) iodine
 - c) aluminum

TRUE OR FALSE Write T on the line next to the number if the sentence is true.
Write F if the sentence is false.

1. _____ An atom has no weight.
2. _____ An electron is the heaviest part of an atom.
3. _____ All atoms weigh the same.
4. _____ All protons weigh the same.
5. _____ All oxygen atoms weigh the same.
6. _____ An oxygen atom can weigh the same as a hydrogen atom.
7. _____ To find the atomic weight of an atom, we add the protons and electrons.
8. _____ The atomic weight of bromine is 79.90.
The rounded off weight is 79.

