

5 • What Do Atoms Look Like?

PRACTICE TEST

- Of the three particles; protons, neutrons, and electrons, which one(s) are responsible for most of the **mass** of an atom?
 - the protons only
 - the electrons only
 - the neutrons only
 - the protons and neutrons
 - the protons and electrons

Questions 2 - 5 refer to the following terms. Each answer may be used once, more than once, or not at all.

- | | |
|------------|-----------------------|
| a) proton | c) electron |
| b) neutron | d) proton and neutron |
- Moves very quickly around the nucleus.
 - Has a mass of 1 amu.
 - Has a charge of -1.
 - Defines the volume of the atom.
 - If you constructed an atomic model the size of the classroom, the nucleus might be formed from
 - several softballs
 - several ping pong balls
 - several pieces of sand
 - The **modern** periodic table has the elements arranged in order of increasing
 - electron energy
 - atomic number
 - atomic size
 - molar mass
 - Which element would be the best conductor?
 - Sn
 - S
 - As
 - P

Questions 9 – 12 refer to the following families.

Each answer may be used once, more than once, or not at all.

- | |
|--------------------------------|
| a) halogen family |
| b) alkaline earth metal family |
| c) alkali metal family |
| d) noble gas family |
- Very unreactive
 - Form 2+ ions
 - React with water
 - Includes Ca, Mg, and Ba
 - The fact that hydrogen forms diatomic molecules makes it similar to the _____ family.
 - halogen
 - alkali metal
 - noble gas
 - alkaline earth metal
 - The fact that hydrogen has one valence electron makes it similar to the _____ family.
 - halogen
 - alkali metal
 - noble gas
 - alkaline earth metal
 - Properties of metals include:
 - brittleness
 - poor conductivity
 - dull surface
 - can be pounded into sheets
 - Which family contains examples of metals, semi-metals, and non-metals?
 - H/Li
 - C/Si
 - F/Cl
 - He/Ne

17. List the elements, P, As, S in order of largest to smallest atomic radius.

- a) $P > As > S$ c) $S > P > As$
 b) $As > P > S$ d) $P > S > As$

18. When a neutral Cl atom becomes a Cl^- ion how and why does the size change?

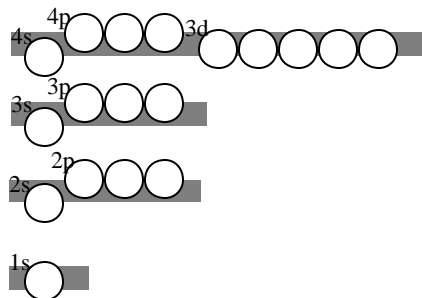
- a) bigger / more electron-electron repulsion
 b) smaller / more electron-proton attraction
 c) bigger / more electron-proton repulsion
 d) smaller / more electron-electron attraction

19. Where are the largest atoms located on the periodic table?

- a) upper right c) upper left
 b) lower right d) lower left

Questions 20 – 22 refer to the iron, Fe, atom:

20. Fill in the orbital diagram for **Fe** ($Z=26$).



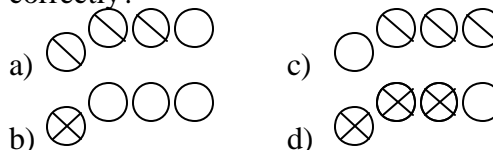
21. Iron's electrons that are farthest from the nucleus occupy the ___ orbital.

- a) 4s c) 3p
 b) 4p d) 3d

22. Iron's electrons that have the highest energy occupy the ___ orbital.

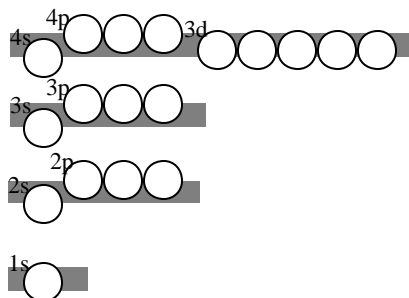
- a) 4s c) 3p
 b) 4p d) 3d

23. Which electrons are being placed into orbitals correctly?



Questions 24 – 26 refer to the sulfur, S, atom:

24. Fill in the orbital diagram for **S** ($Z=16$).



25. How many orbitals in sulfur have only one electron?

- a) zero c) 2
 b) 1 d) 3

26. How many electrons in sulfur are available for bonding (valence electrons)?

- a) 2 c) 6
 b) 4 d) 8

27. Which element below has the greatest ionization energy?

- a) Na c) Mg
 b) K d) Ca

Questions 28 – 31 refer to an isotope with a mass number of 31, 16 protons, and a charge of 2-.

28. The atomic number is ____.
a) 14 b) 15 c) 16 d) 18
29. The isotope contains ____ electrons.
a) 14 b) 15 c) 16 d) 18
30. The nucleus contains ____ neutrons.
a) 14 b) 15 c) 16 d) 18
31. The element is ____.
a) Si b) P c) S d) Ar

Answers: (Please use CAPITAL letters)

- | | | | | | |
|-----|--|-----|----------------|-----|----------------|
| 1. | | 11. | | 21. | |
| 2. | | 12. | | 22. | |
| 3. | | 13. | | 23. | |
| 4. | | 14. | | 24. | see
diagram |
| 5. | | 15. | | 25. | |
| 6. | | 16. | | 26. | |
| 7. | | 17. | | 27. | |
| 8. | | 18. | | 28. | |
| 9. | | 19. | | 29. | |
| 10. | | 20. | see
diagram | 30. | |
| | | | | 31. | |