

## Chapter 5 Review Sheet

Name \_\_\_\_\_

- |  |   |
|--|---|
| _____ 1. hertz                             | A. electrons enter orbitals of lowest energy first  |
| _____ 2. quantum of energy                 | B. a range of colors seen when light passes through a prism                                       |
| _____ 3. spectrum                          | C. lines of colored light obtained by passing the light emitted by an element through a prism     |
| _____ 4. energy level                      | D. the region around an atomic nucleus where electrons are likely to be moving                    |
| _____ 5. atomic orbital                    | E. the SI unit of frequency   |
| _____ 6. amplitude                         | F. the number of wave cycles to pass a given point per unit of time                               |
| _____ 7. wavelength                        | G. a region in space where there is a high probability of finding an electron                     |
| _____ 8. atomic emission spectrum          | H. the amount of energy required to move an electron from one energy level to the next higher one |
| _____ 9. Aufbau principle                  | I. the height of a wave from the origin to the crest  |
| _____ 10. frequency                        | J. the distance between crests of waves   |
| _____ 11. ground state                     | K. $6.6262 \times 10^{-34}$ J s   |
| _____ 12. photon                           | L. It is impossible to know both the velocity and the position of a particle at the same time.    |
| _____ 13. Heisenberg uncertainty principle | M. predicts that all matter exhibits wavelike motions   |
| _____ 14. Planck's constant                | N. the lowest energy level  |
| _____ 15. de Broglie's equation            | O. a process in which electrons are ejected by metals when light shines on them                   |
|  | P. light quantum  |

Answer the following questions or solve the following problems in the space provided.

16. For each group of sublevels, circle the one that fills last as electrons are added?

a. 3p 2p 1s 2s 3s

b. 4p 3p 2p 4s 4d 5s

c. 3d 4s 3p 3s 2s

17. What is the maximum number of electrons in the:

a. 1s orbital

b. 3d orbital

c. 4p orbital

16. Write the electron configuration for the potassium atom.

17. Write the electron configuration for the antimony (Sb) atom.

18. Write the electron configuration for the magnesium atom.

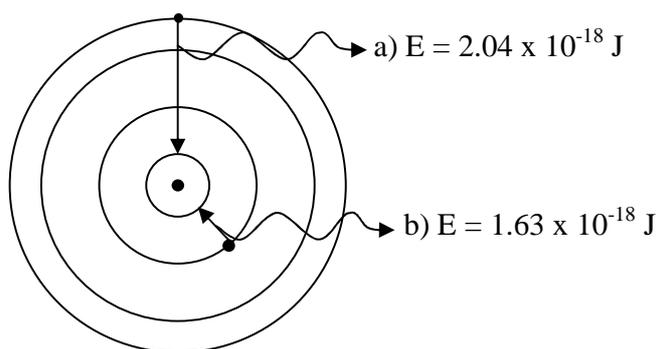
19. Write the electron configuration for the molybdenum atom.

20. What is the element with the electron configuration:  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2$

21. What is the frequency of radiation that has a wavelength of  $4.7 \times 10^{-5}$  cm ?

21. Calculate the wavelength of a photon of blue light whose frequency is  $6.3 \times 10^{14}$  s<sup>-1</sup>.

22. Find the wavelength of each of these transitions in the hydrogen atom.



23. An inexpensive laser that is available to the public emits light that has a wavelength of 670 nm. What is frequency of the radiation?

### True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

- \_\_\_\_\_ 24. Electrons must have a certain minimum amount of energy called a quantum in order to move from one energy level to the next higher energy level.
- \_\_\_\_\_ 25. The electron probability clouds for atomic orbitals are spherical in shape.
- \_\_\_\_\_ 26. The maximum number of electrons that can occupy the fourth energy level of an atom is 32.
- \_\_\_\_\_ 27. The higher the energy level occupied by an electron the more energetic it is.
- \_\_\_\_\_ 28. The principal quantum number equals the number of sublevels within that principal energy level.
- \_\_\_\_\_ 29. The orbitals of a principal energy level are lower in energy than the orbitals in the next higher principal energy level.
- \_\_\_\_\_ 30. The configuration  $3d^4 4s^2$  is more stable than the configuration  $3d^5 4s^1$ .
- \_\_\_\_\_ 31. As many as four electrons can occupy the same orbital.
- \_\_\_\_\_ 32. The Pauli exclusion principle states that an atomic orbital may describe at most two electrons.
- \_\_\_\_\_ 33. The electron configuration for potassium is  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$ .
- \_\_\_\_\_ 34. The electron configuration for copper is  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9 4s^2$ .
- \_\_\_\_\_ 35. The speed of light is a constant that can be obtained by dividing the frequency of light by its wavelength.
- \_\_\_\_\_ 36. The amplitude of a wave is the distance between the crests.
- \_\_\_\_\_ 37. The energy of a body can change only in small discrete units.
- \_\_\_\_\_ 38. The position and velocity of an electron in an atom can be determined with great certainty.