Honors Chemistry Hour\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Dr. Wexler
Electron Configuration and Orbital Diagrams Quiz 1
Date assigned:

1. The further the electron is from the nucleus, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy the electron has.

2. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a region of space in which there is a high probability of finding an electron.

3. How are s orbitals different from p orbitals?

4. How many “s” orbitals can there be in any energy level? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. How many “p” orbitals can there be in any energy level? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. How many “d” orbitals can there be in any energy level? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. How many “f” orbitals can there be in any energy level? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Which is filled first?
A. s or p? \_\_\_\_\_\_\_\_\_
B. p or d?\_\_\_\_\_\_\_\_\_
C. f or d?\_\_\_\_\_\_\_\_\_
D. s or d?\_\_\_\_\_\_\_\_\_

9. State the following Principles:
A. Pauli exclusion Principle

B. Hund’s rule

10.The correct orbital diagram of carbon is:

|  |  |
| --- | --- |
|  | 1s2 2s1 2p3 |
|  | 1s1 2s2 2p3 |
|  | 1s2 2s2 2p4 |
|  | 1s2 2s2 2p2 |
|  | 1s2 2s2 2p6 |

11.Which one of the following is a proper orbital diagram?



|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

12.Which one of the following is a proper orbital diagram?



|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

13.1s2 2s2 2p4 is the electron configuration for:

|  |  |
| --- | --- |
|  | Boron |
|  | Carbon |
|  | Nitrogen |
|  | Oxygen |
|  | Fluorine |

14.1s2 2s2 2p6 is the electron configuration for:

|  |  |
| --- | --- |
|  | Fluorine |
|  | Neon |
|  | Chlorine |
|  | Argon |
|  | Sodium |

15.Which of the following is an appropriate electron configuration for a neutral sodium atom?

|  |  |
| --- | --- |
|  | 1s22s22p6 |
|  | 1s22s32p6 |
|  | 1s22s22p7 |
|  | 1s22s22p63s1 |
|  | 1s22s22p63s2 |

16.Which one of the following is the proper orbital diagram for a neutral lithium atom?



|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |

17. There is an error in this orbital diagram. Explain the error.

****

18. There is an error in this orbital diagram. Explain the error.



19. Draw the orbital diagram for vanadium

20. Using arrows, show how the following orbitals will fill with electrons.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *Electron Configuration* | **1s** | **2s** |  | **2p** |  | **3s** |  | **3p** |  | **4s** |  |  | **3d** |  |  |
| **Mg** | 1s22s22p63s2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Cl** | 1s22s22p63s23p5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Si** | 1s22s22p63s23p2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Ti** | 1s22s22p63s23p64s23d2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

21. What is the definition of a valence electron? Why are valence electrons important?

22. List the number of valence electrons for the following atoms:

A. Potassium

B. Magnesium

C. Carbon

D. Nitrogen

E. Cobalt

F. Zinc

G. Bromine

23. Make a general statement about the number of valence electrons in the D-block elements (transition metals). Name the two “single” anomalies in period 4. Name the “double” anomaly in period 5.