Practice Electron Configuration Worksheet Answer Key PDF

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Part 1: Building a Foundation

Which principle states that electrons fill the lowest energy orbitals first?

undefined. A) Hund's Rule

undefined. B) Pauli Exclusion Principle

undefined. C) Aufbau Principle ✓

undefined. D) Heisenberg Uncertainty Principle

The Aufbau Principle states that electrons fill the lowest energy orbitals first.

Which of the following are types of atomic orbitals? (Select all that apply)

undefined. A) s ✓

undefined. B) p ✓

undefined. C) d ✓

undefined. D) g ✓

The types of atomic orbitals include s, p, d, and g.

Explain the significance of the Pauli Exclusion Principle in electron configuration.

The Pauli Exclusion Principle states that no two electrons can have the same set of quantum numbers, which means that each orbital can hold a maximum of two electrons with opposite spins.

List the order of filling for the first four types of orbitals in an atom.

1. 1s

1s

2. 2s

2s

3. 2 p

2 p

4. 3s

3s

The order of filling for the first four types of orbitals is: 1s, 2s, 2 p, 3s.

Which element has the electron configuration $1s^2$ $2s^2$ 2 p^6 $3s^2$ 3 p^6 $4s^1$?

undefined. A) Potassium ✓

undefined. B) Calcium

undefined. C) Argon

undefined. D) Sodium

The element with the electron configuration $1s^2$ $2s^2$ 2 p^6 $3s^2$ 3 p^6 $4s^1$ is Potassium.

Part 2: Comprehension and Application

Which of the following statements about Hund's Rule are true? (Select all that apply)

undefined. A) Electrons fill degenerate orbitals singly before pairing. ✓

undefined. B) It applies only to s orbitals.

undefined. C) It minimizes electron repulsion. ✓

undefined. D) It is irrelevant for noble gases.

Hund's Rule states that electrons fill degenerate orbitals singly before pairing, which minimizes electron repulsion.

Describe how the periodic table is organized in terms of electron configurations and blocks.

The periodic table is organized into blocks (s, p, d, f) based on the electron configurations of the elements, reflecting their valence electrons and chemical properties.

What is the electron configuration for an element in the d-block of the periodic table?

undefined. A) Ends in p

undefined. B) Ends in d ✓
undefined. C) Ends in s
undefined. D) Ends in f

An element in the d-block of the periodic table has an electron configuration that ends in d.

Given the electron configuration [Ne] $3s^2$ 3 p^4, which element is this?

undefined. A) Sulfur ✓
undefined. B) Chlorine
undefined. C) Phosphorus
undefined. D) Argon

The element with the electron configuration [Ne] $3s^2$ 3 p^4 is Sulfur.

Predict the chemical properties of an element with the electron configuration [Ar] $4s^2$ 3 d^{10} 4 p^5.

An element with the electron configuration [Ar] $4s^2$ 3 d^{10} 4 p^5 is likely to exhibit properties similar to halogens, being highly reactive and capable of forming bonds with alkali metals.

Part 3: Analysis, Evaluation, and Creation

Analyze the following electron configurations and identify which are exceptions to the expected order. (Select all that apply)

undefined. A) [Ar] $4s^1$ 3 d^5 ✓
undefined. B) [Kr] $5s^2$ 4 d^{10} 5 p^6
undefined. C) [Ar] $4s^2$ 3 d^{10} 4 p^6
undefined. D) [Ar] $4s^1$ 3 d^{10} ✓

The exceptions to the expected order of electron configurations include [Ar] $4s^1$ 3 d^5 and [Ar] $4s^1$ 3 d^{10}.

Explain why chromium and copper have electron configurations that are exceptions to the Aufbau Principle.

Chromium and copper have electron configurations that are exceptions to the Aufbau Principle because they achieve greater stability with half-filled (chromium) and fully filled (copper) d subshells.

Which principle can be used to explain the electron configuration of transition metals?

undefined. A) Hund's Rule

undefined. B) Pauli Exclusion Principle

undefined. C) Aufbau Principle

undefined. D) All of the above ✓

The principles that can be used to explain the electron configuration of transition metals include Hund's Rule, Pauli Exclusion Principle, and the Aufbau Principle.

Evaluate the impact of electron configuration on the reactivity of alkali metals.

The electron configuration of alkali metals, which ends in s^1, makes them highly reactive as they readily lose their single valence electron to achieve a stable noble gas configuration.

Propose an electron configuration for a hypothetical element with an atomic number of 120, and justify your reasoning.

1. [Rn] $5f^{14}$ $6s^2$ 6 p^6

[Rn] $5f^{14}$ $6s^2$ 6 p^6

A proposed electron configuration for an element with atomic number 120 could be [Rn] $5f^{14}$ $6s^2$ 6 p^6, following the expected order of filling and the principles of electron configuration.

Which of the following elements would likely form a +2 ion based on its electron configuration?

undefined. A) Magnesium ✓

undefined. B) Sodium

undefined. C) Aluminum

undefined. D) Potassium

Magnesium would likely form a +2 ion based on its electron configuration, as it has two valence electrons that it can easily lose.