Electron Configuration Practice Worksheet

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Part 1: Building a Foundation

What is the maximum number of electrons that can occupy a single p orbital?

Hint: Consider the electron capacity of orbitals.

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 6

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Which of the following principles are used to determine electron configuration? (Select all that apply)

Hint: Think about the rules governing electron arrangement.

- ☐ Aufbau Principle

- [ ] Pauli Exclusion Principle
- [ ] Hund's Rule
- [ ] Heisenberg Uncertainty Principle

Which of the following principles are used to determine electron configuration? (Select all that apply)

Hint: Think about the foundational principles of quantum mechanics.

- [ ] Aufbau Principle
- [ ] Pauli Exclusion Principle
- [ ] Hund's Rule
- [ ] Heisenberg Uncertainty Principle

Which of the following principles are used to determine electron configuration? (Select all that apply)

Hint: Think about the foundational principles of electron arrangement.

- [ ] Aufbau Principle
- [ ] Pauli Exclusion Principle
- [ ] Hund's Rule
- [ ] Heisenberg Uncertainty Principle

Describe the Pauli Exclusion Principle and its significance in electron configuration.

Hint: Consider how this principle affects electron pairing.

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List the four types of orbitals and their maximum electron capacities.

Hint: Think about the shapes and capacities of orbitals.

1. s orbital

2. p orbital

3. d orbital

4. f orbital

Which of the following is the correct electron configuration for the element Neon (Ne)?

Hint: Recall the electron configuration for noble gases.

- ◯ $1s^2\ 2s^2\ 2\ p^6$
- ◯ $1s^2\ 2s^2\ 2\ p^4$

- ◯ $1s^2\ 2s^2\ 2\ p^2$
- ◯ $1s^2\ 2s^2\ 3s^2$

Which of the following is the correct electron configuration for the element Neon (Ne)?

Hint: Recall the order of filling orbitals.

- ◯ $1s^2\ 2s^2\ 2\ p^6$
- ◯ $1s^2\ 2s^2\ 2\ p^4$
- ◯ $1s^2\ 2s^2\ 2\ p^2$
- ◯ $1s^2\ 2s^2\ 3s^2$

Which of the following is the correct electron configuration for the element Neon (Ne)?

Hint: Consider the total number of electrons in Neon.

- ◯ $1s^2\ 2s^2\ 2\ p^6$
- ◯ $1s^2\ 2s^2\ 2\ p^4$
- ◯ $1s^2\ 2s^2\ 2\ p^2$
- ◯ $1s^2\ 2s^2\ 3s^2$

Part 2: Application and Analysis

How does the position of an element in the periodic table relate to its electron configuration?

Hint: Consider the trends in the periodic table.

- ◯ It determines the number of protons.
- ◯ It indicates the number of neutrons.
- ◯ It shows the order of electron filling.
- ◯ It specifies the atomic mass.

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Hint: Think about the organization of the periodic table.

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- ◯ It specifies the atomic mass.

Which of the following elements have electron configurations that end in 3 d? (Select all that apply)

Hint: Think about the transition metals.

- ☐ Scandium
- ☐ Iron
- ☐ Zinc
- ☐ Calcium

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Explain Hund's Rule and provide an example of how it applies to filling the p orbitals.

Hint: Consider how electrons occupy orbitals of the same energy.

Explain Hund's Rule and provide an example of how it applies to filling the p orbitals.

Hint: Consider how electrons fill orbitals of the same energy.

Explain Hund's Rule and provide an example of how it applies to filling the p orbitals.

Hint: Consider the distribution of electrons in orbitals.

Write the electron configuration for the following ions:

Hint: Consider the charge of the ions when writing configurations.

1. Na^+

2. Cl^-

Which of the following elements has the electron configuration [Ar] $4s^1$ 3 d^5?

Hint: Recall the electron configurations of transition metals.

- ◯ Chromium
- ◯ manganese
- ◯ Iron
- ◯ Copper

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Describe how the electron configuration of an atom changes when it forms a cation.

Hint: Consider the loss of electrons in cation formation.

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Part 3: Evaluation and Creation

Which of the following are exceptions to the typical electron configuration rules? (Select all that apply)

Hint: Think about elements that have unique electron configurations.

- [ ] Copper
- [ ] Chromium
- [ ] Potassium
- [ ] Zinc

Which of the following are exceptions to the typical electron configuration rules? (Select all that apply)

Hint: Think about the transition metals and their configurations.

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Analyze why certain elements like copper and chromium have electron configurations that differ from the expected pattern.

Hint: Consider the stability of half-filled and fully filled orbitals.

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Analyze why certain elements like copper and chromium have electron configurations that differ from the expected pattern.

Hint: Consider the stability of half-filled and fully filled orbitals.

In which of the following situations would an electron configuration be used to predict chemical behavior?

Hint: Think about the role of electron configuration in reactivity.

- ◯ Determining atomic mass
- ◯ PredictING reactivity
- ◯ Calculating density
- ◯ Measuring temperature

In which of the following situations would an electron configuration be used to predict chemical behavior?

Hint: Think about the role of valence electrons.

- ◯ Determining atomic mass
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Hint: Think about the role of valence electrons.

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Evaluate the importance of electron configuration in determining the magnetic properties of an element. Provide examples to support your answer.

Hint: Consider how unpaired electrons contribute to magnetism.

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Hint: Consider the role of unpaired electrons.

Which of the following scenarios would most likely require a creative approach to solve using electron configuration?

Hint: Consider applications of electron configuration in material science.

- ◯ Identifying the number of protons in an atom
- ◯ DesignING a new material with specific magnetic properties
- ◯ Calculating the atomic mass of an element
- ◯ Measuring the volume of a gas

Which of the following scenarios would most likely require a creative approach to solve using electron configuration?

Hint: Consider practical applications of electron configuration.

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