Answer all the questions below as fully as you can then check your answers

1. Which of the following is an anion?

A) Na^+ B) Cl^- C) Fe^{2+} D) Cu^{2+}

2. Fill in the Gap to complete the sentence:

The electron configuration of a sodium cation (Na^+) is _____.

3. Which of the following cations has the electron configuration $[Ar]3d^6$

A) Fe^{2+} B) Fe^{3+} C) Cr^{3+} D) Cu^{2+}

4. Match the following elements with their correct anionic electron configuration:

Element
N
P
Cl

Anionic electron configuration
$1s^2 2s^2 2p^6 3s^2 3p^6$
$1s^2 2s^2 2p^6$
$1s^2 2s^2 2p^6 3s^2 3p^6$

5. Fill in the gap to complete the sentence below:
The electron configuration of a calcium cation (Ca^{2+}) is _____.

6. Write the electron configuration for the chromium atom (Cr) and explain why it is an exception to the typical filling order.

7. Match the following elements with their correct cationic electron configuration:

Element
Fe^{2+}
Fe^{3+}
Cu^{+}

cationic electron configuration
$[Ar]3d^{5}$
$[Ar]3d^{10}$
$[Ar]3d^{6}$

8. Explain why the 4s electrons are lost before the 3d electrons when transition metals form cations. Use the example of iron (Fe) in your explanation.

Answers

1. Which of the following is an anion?

A) Na^+ B) Cl^- C) Fe^{2+} D) Cu^{2+}

Answer: B) Cl^-

2. Fill in the Gap to complete the sentence:

The electron configuration of a sodium cation (Na^+) is _____.

Answer: $1s^2 2s^2 2p^6$ or [Ne]

3. Which of the following cations has the electron configuration $[Ar]3d^6$

A) Fe^{2+} B) Fe^{3+} C) Cr^{3+} D) Cu^{2+}

Answer: A) Fe^{2+}

4. Match the following elements with their correct anionic electron configuration:

Element	Anionic electron configuration
N	$1s^2 2s^2 2p6 3s^2 3p^6$
P	$1s^2 2s^2 2p^6$
Cl	$1s^2 2s^2 2p6 3s^2 3p^6$

5. Fill in the gap to complete the sentence below:

The electron configuration of a calcium cation (Ca^{2+}) is _____.

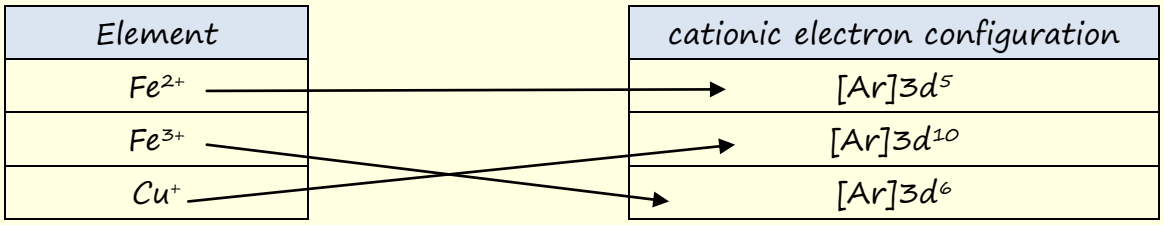
Answer: $1s^2 2s^2 2p^6 3s^2 3p^6$ or [Ar]

6. Write the electron configuration for the chromium atom (Cr) and explain why it is an exception to the typical filling order.

Answer: Cr: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$

Explanation: Chromium is an exception to the Aufbau principle because the half-filled 3d subshell ($3d^5$) and partially filled 4s subshell ($4s^1$) offer additional stability compared to the expected configuration $[Ar]4s^2 3d^4$

7. Match the following elements with their correct cationic electron configuration:



8. Explain why the 4s electrons are lost before the 3d electrons when transition metals form cations. Use the example of iron (Fe) in your explanation.

Answer: The 4s orbital is higher in energy than the 3d orbital once electrons are filled. When forming cations, transition metals lose the 4s electrons first because they are higher in energy and further from the nucleus.