

Practicing Electron Configuration

Answers

1. Answer the following questions

- i. How many p orbitals can there be in an energy level? Three
- ii. Which is the lowest energy level with an s orbital? 1
- iii. Which is the lowest energy level that can have a p orbital? 2
- iv. How many d orbitals can there be in an energy level? Five
- v. How many d electrons can there be in an energy level? Ten

2. Identify the element with the following electron configuration

- i. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$ Selenium
- ii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2$ Strontium
- iii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^7$ Ruthenium
- iv. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10}$ Mercury
- v. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^1$ Francium

3. Which elements are represented by each of the following electron configurations?

- i. $1s^2 2s^2 2p^5$ F ii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^4$ Te
- iii. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ Ca iv. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$ Br

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

5. What is the electronic configuration of aluminum, Al? $1s^2 2s^2 2p^6 3s^2 3p^1$

6. What is the noble gas configuration for the Pb atom? $[\text{Xe}] 6s^2 4f^{14} 5d^{10} 6p^2$

7. When two electrons occupy the same orbital, they must have the same or opposite spin? Opposite

8. Explain why the following electron configuration is invalid: $1s^2 2s^2 2p^6 3s^3 3d^5$?

$3p$ comes after $3s$ and the $3s$ can only contain 2 electrons.

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1. Answer the following questions

- How many p orbitals can there be in an energy level? _____
- Which is the lowest energy level with an s orbital? _____
- Which is the lowest energy level that can have a p orbital? _____
- How many d orbitals can there be in an energy level? _____
- How many d electrons can there be in an energy level? _____

2. Identify the element with the following electron configuration

- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^1 4d^7$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10}$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^6 7s^1$ _____

3. Which elements are represented by each of the following electron configurations?

- $1s^2 2s^2 2p^5$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^4$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ _____
- $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$ _____

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

5. What is the electronic configuration of aluminum, Al? _____

6. What is the noble gas configuration for the Pb atom? _____

7. When two electrons occupy the same orbital, they must have the same or opposite spin? _____

8. Explain why the following electron configuration is invalid: $1s^2 2s^2 2p^6 3s^3 3d^5$
