

Exercise walk-through

1.5

Atomic Structure and Electron Configuration

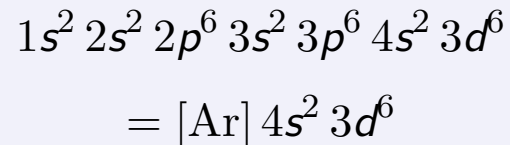
AP Chemistry

Atomic structure and electron configuration

Electrons fill **subshells** s, p, d, f
(holding 2, 6, 10, 14) by three rules:

- **Aufbau** – lowest energy first
- **Pauli** – 2 per orbital,
opposite spin
- **Hund** – spread out singly
before pairing

Iron, $Z = 26$



The outer **valence electrons** drive
bonding – so a column shares chemistry.

Exercises 2.1-2.3

2.1 Write the electron configuration of oxygen (8 electrons). [2]

2.2 Which subshell fills first, $4s$ or $3d$? [1]

2.3 The configuration $1s^2 2s^2 2p^6 3s^1$ has how many electrons? [1]

Exercises 2.1-2.3

2.1 Write the electron configuration of oxygen (8 electrons). [2]

2.1

- $1s^2 2s^2 2p^4$
-

2.2 Which subshell fills first, $4s$ or $3d$? [1]

2.2

- $4s$
-

2.3 The configuration $1s^2 2s^2 2p^6 3s^1$ has how many electrons? [1]

2.3

- 11

Exercises 2.4·3.1

2.4 What holds the electrons to the nucleus?

[1]

3.1 In an atom, the electrons are held to the nucleus by

[1]

☐

A gravity

B Coulombic (electrostatic) attraction

C magnetism

D friction

Exercises 2.4·3.1

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[1]

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- Coulombic (electrostatic) attraction

3.1 In an atom, the electrons are held to the nucleus by

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A gravity

B Coulombic (electrostatic) attraction

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D friction

3.1 B

- Coulombic attraction

Exercise 3.2

3.2 The electron configuration of neon (10 electrons) is

[1]

☐

A $1s^2 2s^2 2p^6$

B $1s^2 2s^2 2p^4$

C $1s^2 2s^4 2p^4$

D $1s^2 2s^2 2p^8$

Exercise 3.2

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[1]

☐

A $1s^2 2s^2 2p^6$

B $1s^2 2s^2 2p^4$

C $1s^2 2s^4 2p^4$

D $1s^2 2s^2 2p^8$

3.2 A

- $1s^2 2s^2 2p^6$ ($2 + 2 + 6 = 10$)

Exercise 3.3 (a)

3.3 Consider the element magnesium (12 electrons).

(a) Write its electron configuration.

[2]

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[2]

(a)

- $1s^2 2s^2 2p^6 3s^2$

Exercise 3.3 (b)

3.3 Consider the element magnesium (12 electrons).

(b) State how many electrons are in its outer ($3s$) shell.

[1]

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[1]

(b)

- 2

Exercise 3.4 (a)

3.4 An atom has the configuration $1s^2 2s^2 2p^6 3s^2 3p^4$.

(a) Find the total number of electrons.

[2]

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[2]

(a)

- $2 + 2 + 6 + 2 + 4 = 16$

Exercise 3.4 (b)

3.4 An atom has the configuration $1s^2 2s^2 2p^6 3s^2 3p^4$.

(b) State whether inner-shell or outer-shell electrons are harder to remove.

[1]

Exercise 3.4 (b)

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(b)

- Inner-shell electrons