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السؤال 1



Select the best answer from the drop-down menu to complete the sentence.

Electron configuration   notation uses numbers and letters to represent the electrons in the energy sublevels.

السؤال 2



Select the best answer.

Calcium has an atomic number of 20. A stable calcium atom has an electronic configuration of:

☒ $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$ 

☐ $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$

☐ $1s^2 1p^6 1d^{10} 1f^2$

☐ $1s^2 2s^2 2p^6 3s^2 3p^6$

السؤال 3



Fill in the blank to complete the sentence.

A stable bromine atom has an electronic configuration of $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$. From

electron configuration bromine has an atomic number of

35



السؤال 4



Fill in the blanks with the best answers from the Word Bank to complete the sentence.

Word Bank					
occupied	unoccupied	attraction	repulsion	orbital	principal energy level

The expected electron configuration of chromium (Cr) is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$. While the actual electron configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$.

Due to electron **repulsion**, one of the paired electrons in the outer s

orbital moves into an **unoccupied** d orbital. This gives rise to a more stable electron configuration.

السؤال 5



Select the correct terms from the drop-down menus to complete the sentence.

In the energy sublevel 1s, 1 represents the principal energy level ✓ ▼ and s

indicates the shape of the orbital ✓ ▼.

السؤال 6



Drag and drop the correct answer to identify the type of diagram shown.

↕ valence electrons

↕ quantum mechanical model

↕ electron-dot structure

orbital diagram ✓

السؤال 7



Select the correct answer.

Study the electron configuration for the element chromium (Cr) below.

Expected electron configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$
Actual electron configuration	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$

How and why does the actual electron configuration differ from the expected electron configuration?



Both $4s^2$ electrons move into the d orbital which results in the configuration $3d^3$. Completely filled outer d orbital provides more stability to chromium.



Due to electron attraction, the $4s^2$ electrons move into the d orbital. This increases the reactivity of chromium.



Electrons from the inner orbitals move into the d orbital which results in the configuration $3d^3$. This makes chromium an inert element.



Due to electron repulsion, one of the $4s^2$ electrons moves into an unoccupied d orbital. Half-filled outer d orbital provides more stability to chromium.



السؤال 8



Select the correct answer.

The element oxygen has the atomic number of 8. The correct electron configuration for oxygen is: _____



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



$1s^1 2s^1 2p^3 3s^1 3p^2$

☐ $1s^1 2s^1 2p^6$ ☐ $1s^2 2s^3 2p^3$

السؤال 9



Select the correct answer.

The electronic configuration of an element with an atomic number of 8 is_____.

☐ $2s^2 2p^6$ ☐ $1s^2 2s^6$ ☒ $1s^2 2s^2 2p^4$ ☐ $1s^2 2s^2 2p^6$

السؤال 10



Drag and drop the correct answer.

Phosphorus has an atomic number of 15. A stable phosphorus atom has an electronic configuration of $1s^2 2s^2 2p^6 3s^2 3p^3$ ✓.

↕ $1s^2 1p^6 1d^7$

↕ $1s^2 1p^6 2s^2 2p^5$

↕ $1s^2 2s^2 2p^6 3s^2 3p^1 4s^2$

السؤال 11



Drag and drop the correct answer to identify the image.

↕ configuration notation

↕ orbital structure

↕ aufbau diagram

السؤال 12



sublevel
diagram ✓

Select the correct answer.

Consider the element copper (Cu) with an atomic number of 29.

Would it be correct to write the electron configuration of copper as $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$ instead of $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$?

Select the correct answer and reason from the options given below.

☒ Yes. The configuration for the outer orbitals $4s^1 3d^{10}$ represents a filled set of d orbitals, which increases the stability of the element.



No. The electronic configuration is incorrect.
The electronic configuration needs to be $1s^2 2s^2 2p^4 3s^2 3p^5 4s^2 3d^{12}$.



No. The electronic configuration is incorrect.
The configuration for outer orbitals needs to be $4s^2 3d^{10}$ since this is the accepted notation.



The configuration for the outer orbitals does not matter.
 $4s^2 3d^{10}$ represents unoccupied d orbitals, which makes the element more reactive.

السؤال 13



Select the correct answer.

The electron configuration of chromium is written as: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$
Is this the expected configuration? Select the correct answer and reason from the options below.

☐ This is not the expected configuration.

The expected configuration for the outer orbitals is: $4s^2 3d^4$



This is not the expected configuration.

The expected configuration for the outer orbitals is: $4s^2 4p^4$



This is the expected configuration.

Both $4s^2 3d^4$ and $4s^1 3d^5$ can represent the configuration of the outer orbitals.



This is the expected configuration.

The expected configuration for the outer orbitals is: $4s^1 3d^5$

السؤال 14



Select the correct answer.

How many incomplete orbitals are there in a bromine atom?



One in f sub-level



One in s orbital



One in d orbital



One in p sub-level

السؤال 15



Select the correct answer from the drop-down menu.

Consider the electron configuration notation $3s^2$.

The superscript 2 represents the

two electrons in the 3s orbital ✓ ▼

السؤال 16



Select the correct answer from the drop-down menu.

The element lithium (Li) has an atomic number of 3. The electron configuration for lithium is

$1s^2 2s^1$ ✓ ▼