

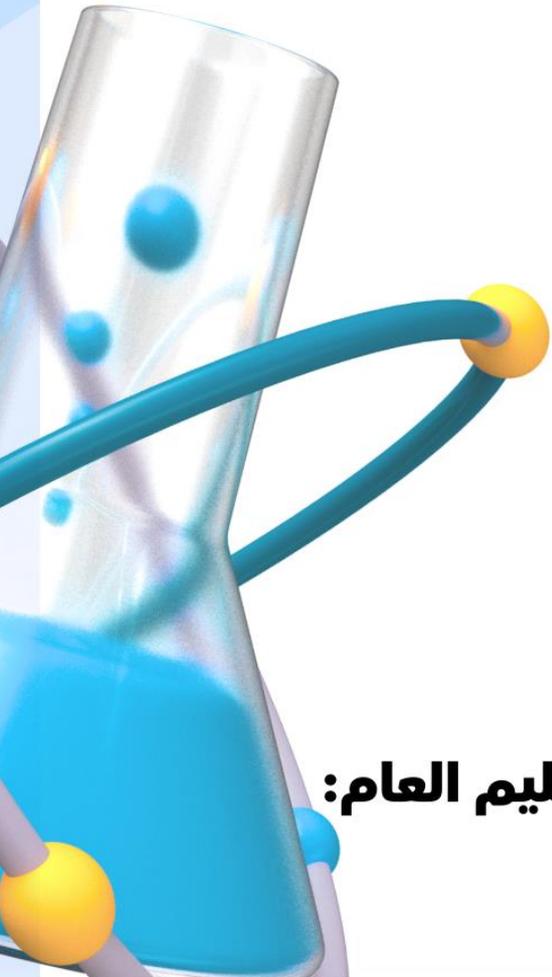
الإدارة المركزية للتعليم العام  
مكتب تنمية مادة العلوم



# CHEMISTRY

2nd secondary  
Second term

# HOME PERFORMANCE



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د. هالة عبدالسلام خفاجي

2026

week

3

## Home performance (Week 3)

**Q1/ choose the correct answer:-**

**(1) Which of the following molecules doesn't obey the octet rule?**

- a) CH<sub>4</sub>
- b) NH<sub>3</sub>
- c) NO<sub>2</sub>
- d) H<sub>2</sub>O

**2-Using the following table:**

Group number	The element
15	X
13	Y
16	Z

**-Which of the following compounds has central atom that follow the octet Rule?**

- (a) XCl<sub>3</sub> and YCl<sub>3</sub>
- (b) YCl<sub>3</sub> and ZCl<sub>2</sub>
- (c) XCl<sub>3</sub> and ZCl<sub>2</sub>
- (d) YCl<sub>3</sub> only

**3 - Given that the molecular formulas of the chlorides of elements (A) and (B) are (ACl<sub>3</sub>) and (BCl<sub>2</sub>) respectively, and both obey the octet rule;**

**-which of the following choices represents the valence shell electron Configuration for elements (A) and (B)**

- (a) A: ns<sup>2</sup>, np<sup>1</sup> , B: ns<sup>2</sup>, np<sup>4</sup>
- (b) A: ns<sup>2</sup>, np<sup>3</sup> , B: ns<sup>2</sup>, np<sup>4</sup>
- (c) A: ns<sup>2</sup>, np<sup>3</sup> , B: ns<sup>2</sup>, np<sup>2</sup>
- (d) A: ns<sup>2</sup>, np<sup>5</sup> , B: ns<sup>2</sup>, np<sup>4</sup>



**4- Which of the following choices represents Hydrazine molecule ( $\text{H}_2\text{N-O-H}$ )? ( ${}_1\text{H}, {}_7\text{N}, {}_8\text{O}$ )**

	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	3	2
d	2	3

**5- The hydrogen molecule reaches a state of stability when the two hydrogen Atoms approach each other to a distance at which:**

- The electron density is as high as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.
- The electron density is as low as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- The electron density is as high as possible and the energy of the molecule is less Than the sum of the energies of its atoms.
- The electron density is as low as possible and the energy of the molecule is Greater than the sum of the energies of its atoms.

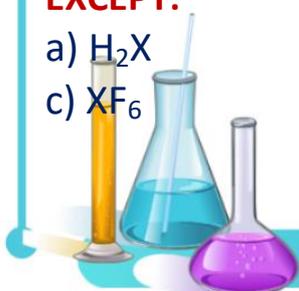
**6- According to the Valance bond theory, the covalent bond in (HF) molecule is Formed as a result of:**

- The overlap of the (1s) orbital of the hydrogen atom with the ( $2p_z$ ) orbital of the Fluorine atom
- The overlap of the (1s) orbital of the hydrogen atom with the ( $2p_y$ ) orbital of The fluorine atom
- The fluorine atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- The overlap of the (1s) orbital of the hydrogen atom and the orbital ( $2p_x$ ) of the Fluorine atom element (X) has 6 valence electrons.

**7- Element (X) has 6 valence electrons.**

**all of the following compounds of element (X) obey the Electronic Theory of Valency EXCEPT:"**

- |                         |                   |
|-------------------------|-------------------|
| a) $\text{H}_2\text{X}$ | b) $\text{XF}_2$  |
| c) $\text{XF}_6$        | d) $\text{XCl}_2$ |



**8- According to the Valence bond theory, the covalent bond in ammonia (NH<sub>3</sub>) is Formed as a result of:**

- a) The overlap of the (1s) orbital of the hydrogen atom with the single electron Orbital of the nitrogen atom
- b) Contact between the energy level (K) of the hydrogen atom and the energy Level (L) of the nitrogen atom
- c) The nitrogen atom reaching a stable state by surrounding itself with eight Electrons through sharing.
- d) Overlap of the (1s) orbital of the hydrogen atom with the (2s) orbital of the Nitrogen atom

**9- Which of the following molecules did the simple concept of covalent bonding fail to explain?**

- a) H<sub>2</sub>
- b) BeF<sub>2</sub>
- c) HF
- d) Cl<sub>2</sub>

**10- Which of the following choices represents Hydrazine molecule (H<sub>2</sub>N-NH<sub>2</sub>)? (1H,7N,8O)**

	Number of lone pairs	Number of bond pairs
a	4	3
b	3	4
c	2	6
d	2	5

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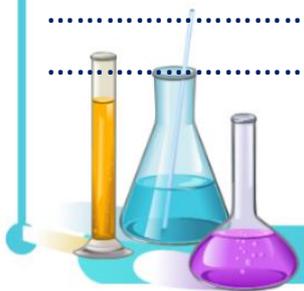
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مكتب تنمية مادة العلوم



# CHEMISTRY

2nd secondary  
first term

Second term

# WEEKLY ASSESSMENTS



إعداد:

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د. هالة عبدالسلام خفاجي

2026

week

3

A

## Weekly assessment (Week-3)

### Q1/ State the scientific reason:

- Valence Bond Theory (based solely on the concept of atomic orbital overlap) was unable to explain the structure of the 'Boron Trifluoride' molecule

### Q2/ Using the following table:

Atomic number	Element
1	X
13	Y
16	Z
17	W

1- Write the chemical formula of the compound formed by the combination of Element (Y) and element (W). Does it obey the Octet Rule? Explain why.

2- According to the Valence Bond Theory (VBT), identify the atomic orbitals Involved in forming the bond in the molecule (XW).

### Q3/ Choose the correct answer: -

1- Which of the following is true for boron trifluoride: -

- Obeys to the octet rule.
- Its bonds can be explained by the concept of orbital overlap.
- Obeys to the octet rule, and its bonds can be explained by V.B.T in its simplest form.
- does not obey to octet rule, and its bonds cannot be explained by V.B.T in its simplest form.

2- Which of the following options describes the phosphine molecule  $\text{PH}_3$ ?

- Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the single electron orbital of the (P) atom.
- Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the orbital containing a single electron from the (P) atom.
- Obeys to the octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom.
- Does not obey to octet rule, and the bond is formed by the overlap of the (s) orbital of the (H) atom with the (s) orbital of the (P) atom, which has a single electron.



**B**

**Q1/ State the scientific reason:**

- The octet theory does not apply to the  $\text{NO}_2$  molecule.

**Q2/ Using the following table:**

Atomic number	Element
1	X
13	Y
16	Z
17	W

1- Write the chemical formula for the element (W). Does the octet rule apply to it, and why?

2- According to the valence bond theory, identify the atomic orbitals that form the bond in the molecule ( $\text{X}_2$ )

**Q3/ Choose the correct answer: -**

**1- Which of the following options describes the beryllium chloride molecule  $\text{BeCl}_2$ : -**

- a) Does not obey to octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.
- b) Does not obey to octet rule, and its bonds can be explained by the simple Concept of orbital overlap.
- c) Obeys to the octet rule and its bonds can be explained by the simple Concept of orbital overlap.
- d) Obeys to the octet rule, and its bonds cannot be explained by the simple Concept of orbital overlap.

**2- Which of the following statements correctly describes the phosphorus chloride Molecule  $\text{PCl}_3$  .....**

- a) Does not obey to octet rule, and the bond is formed by the overlap of the ( $p_x$ ) Orbital of the (Cl) atom with the orbital containing a single electron of the (P) atom.
- b) Does not obey to octet rule, and the bond is formed by the overlap of the ( $p_z$ ) Orbital of the (Cl) atom with the orbital containing a lone electron of the (P) atom
- c) Obeys to the octet rule and the bond is formed by the overlap of the ( $p_z$ ) orbital of The (Cl) atom with the orbital containing a single electron from the (P) atom
- d) Obeys to the octet rule, and the bond is formed by the overlap of the ( $p_x$ ) orbital of The Cl atom with the orbital containing a single electron of the (P) atom.



**Q1/ State the scientific reason:**

1- Failure of the concept of simple atomic orbital overlap to explain the bonds in the  $\text{BeF}_2$  molecule

**Q2/ Using the following table:**

Atomic number	Element
1	X
13	y
6	Z
17	W

1- -Write the chemical formula for a compound consisting of elements (Z) and (X) That obeys to octet rule.

2- According to the valence bond theory, identify the atomic orbitals that form The bond in the molecule (XW).

**Q3/ Choose the correct answer: -**

**1- Which of the following describes ( $\text{PCl}_5$ ) molecule?**

- a) Obeys to octet rule, and its bonds cannot be explained by the simple concept of V.B.T
- b) Its bonds can be explained by simple concept of V.B.T
- c) Obeys to octet rule and its bonds can be explained by simple concept of V.B.T
- d) Does not obey to octet rule, and its bonds cannot be explained by simple concept of V.B.T

**2- Which of the following statements correctly describes the hydrogen fluoride Molecule HF?**

- a) The octet theory does not apply to it, and its bonds arise from the overlap of the (s) Orbital of hydrogen with the (s) orbital of the fluorine atom.
- b) Obeys to octet rule, and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the ( $2p_z$ ) orbital of the fluorine atom.
- c) Obeys to octet rule and its bonds arise from the overlap of the (1s) orbital of Hydrogen with the (2s) orbital of the fluorine atom.
- d) Does not obey to octet rule, and its bonds arise from the overlap of the (1s) orbital Of hydrogen with the ( $2p_z$ ) orbital of the fluorine atom.

