

Topic 4- Bonding

Multiple Choice

1. Of the following molecules, which ones have an ionic bond only?

1. CO₂ 2. O₂ 3. CaCl₂ 4. KBr 5. H₂O
A) 1 and 2 B) 1 and 5 C) 3 and 4 D) 3 and 5

Answer: C

2. Which combination below has only molecules with ionic bonds?

- A) CaI₂, PF₃, NaF, HF C) NaF, CaI₂, MgCl₂, KCl
B) CaI₂, PF₃, NaF, H₂O D) NaF, CaI₂, MgCl₂, HF

Answer: C

3. A compound is made of two hypothetical elements, X and Z. Element X belongs to family II and element Z belongs to family V. Which of the formulas below correctly represents this compound?

- A) X₂Z₃ B) X₂Z₅ C) X₃Z₂ D) X₅Z₂

Answer: C

4. Which of the following compounds are held together by ionic bonds?

1. CaF₂ 2. CF₄ 3. OF₂ 4. NaF
A) 1 and 2 B) 1 and 4 C) 2 and 3 D) 3 and 4

Answer: B

5. Which of the following molecular formulas represent ionic bonds?

1. LiCl 4. H₂O 7. K₂S
2. O₂ 5. AlCl₃ 8. N₂O₃
3. CH₄ 6. CaF₂
A) 1, 5, 6 and 7 B) 1, 6, 7 and 8 C) 2, 3, 4 and 5 D) 2, 3, 4 and 8

Answer: A

6. Which of the following compounds have covalent bonds?

1. Na₂CO₃ 2. C₃H₈ 3. Al₄C₃ 4. Si₃N₄
5. Ca₃N₂ 6. P₂O₅ 7. PBr₅ 8. Mg₃P₂
A) 1, 3, 5 and 8 B) 1, 3, 6 and 8 C) 2, 4, 5 and 7 D) 2, 4, 6 and 7

Answer: D

7. Which of the following pairs of elements form ionic bonds?

- 1) C and S 4) N and O
2) Ca and O 5) C and Cl
3) Na and Cl
A) 2 and 3 B) 2 and 5 C) 1, 4 and 5 D) 1, 2 and 3

Answer: A

8. Six compounds are listed below:

1. K_2CrO_4 2. C_4H_9OH 3. H_2O
4. $Ca(HCO_3)_2$ 5. PCl_3 6. KOH

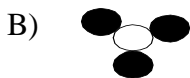
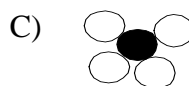
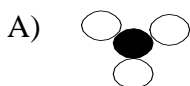
Which of these are covalently bonded compounds?

- A) 1, 2 and 3 B) 1, 4 and 6 C) 2, 3 and 5 D) 4, 5 and 6

Answer: C

9. Which of the following structures best represents carbon tetrachloride?

(Carbon : ● and chlorine : ○)



Answer: C

10. What is the molecular formula of sodium nitride?

- A) S_3N B) Na_3N C) Na_3S D) N_3Na

Answer: B

11. Which of the following elements does not exist in the form of a diatomic molecule?

- A) Nitrogen B) Bromine C) Oxygen D) Neon

Answer: D

12. Which of the following elements will combine with two atoms of hydrogen to form a molecule similar to that of water, H_2O ?

- A) F B) S C) N D) Ne

Answer: B

13. According to the octet rule, how many hydrogen atoms will combine with a nitrogen atom?
 A) 4 B) 3 C) 2 D) 1

Answer: 3

14. Which of the following best describes an ionic bond?
 A) It is formed when one or more electrons transfer from a non-metal to a metal.
 B) It is formed following the transfer of one or more electrons between two non-metals.
 C) It is formed when one or more electrons transfer from a metal to a non-metal.
 D) It is formed following the transfer of one or more electrons between two metals.

Answer: C

15. Which of the following four statements relating to a covalent bond is **false**?
 A) The electrons are shared between the partners in the bond.
 B) The formation of ions results in this type of bonding.
 C) The octet rule is obeyed by the partners in the bond if they are non-metals.
 D) This type of bond can be formed between a non-metal and hydrogen.

Answer: B

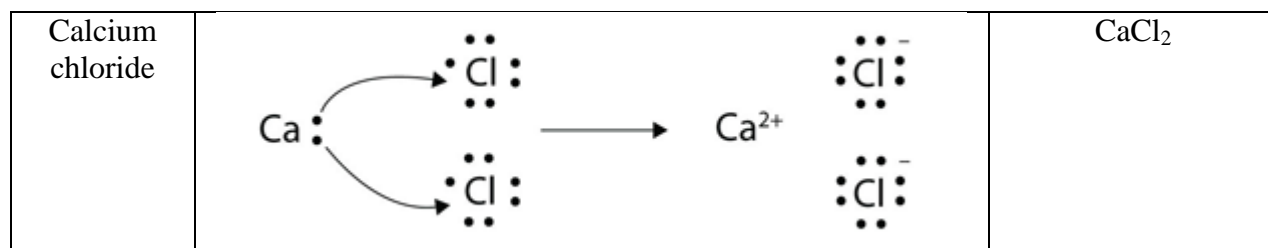
16. Na_2O is a chemical used in the production of glass and ceramics. What is the chemical name of Na_2O , according to the rules of nomenclature?
 A) Disodium monoxide C) Sodium dioxide
 B) Disodium oxide D) Sodium oxide

Answer: D

Short Answer

17. Make a Lewis diagram for each and give the molecular formula.

	Lewis diagram	Molecular formula
Magnesium fluoride		MgF_2
Chlorine		Cl_2
Phosphorus trichloride		PCl_3



18. Give the molecular formula for the following.

Beryllium sulfide	BeS	Hydrogen fluoride	HF
Sodium oxide	Na ₂ O	Dihydrogen sulfide	H ₂ S
Diphosphorus trisulfide	P ₂ S ₃	Iodine	I ₂
Carbon tetrachloride	CaCl ₄	Aluminum sulfide	Al ₂ S ₃

19. Name the following molecules.

Na ₃ P	Sodium phosphide	SCl ₂	Sulphur dichloride
NaCl	Sodium chloride	PF ₃	Phosphorus trifluoride
NH ₃	Nitrogen trihydride	C ₂ S ₄	Dicarbon tetrasulfide
O ₂	Oxygen	BeCl ₂	Beryllium chloride

20. A compound has a molecular formula of XY₂. Element Y belongs to the halogen family of the periodic table. To which family does element X belong?

Answer: Alkaline earth

21. In a laboratory, a salt was formed using calcium (Ca) and chlorine (Cl).

- Determine the molecular formula of the compound formed.
- Name the type of bond between these atoms.

Answer: a- CaCl₂ b- calcium chloride

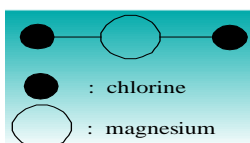
22. A compound is made of magnesium and sulfur. Give the correct molecular formula for this compound.

Answer: MgS

23. What is the correct molecular formula of a compound formed by an element "Y" from group IV and an element "Z" from group VI?
Give the correct molecular formula for this compound.

Answer: Y_4Z_2 because Y from group 4 can make 4 bonds and Z from group 6 can make 2 bonds. The bonds are then crossed over.

24. The molecule of a particular substance is represented below.



a- What is the chemical name of this substance according to the rules for naming binary compounds?

b- What is the molecular formula?

Answer: a- magnesium chloride

b- $MgCl_2$