



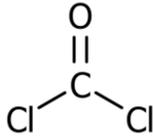
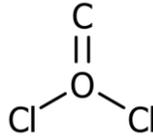
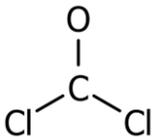
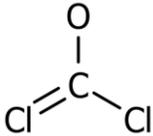
Practice Questions

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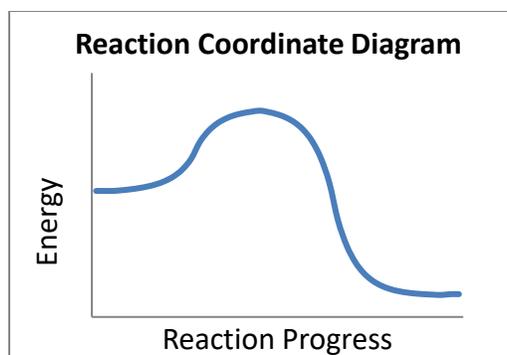
—Students should be provided with CEF’s periodic table (competition version).—

- (1) What happens to electrons when a covalent bond is formed?
- A. They are transferred from metals to nonmetals
 - B. They are transferred from nonmetals to metals
 - C. They are shared between two metals
 - D. They are shared between two nonmetals
- (2) In which form is an oxygen atom most likely to have the largest mass number?
- A. As pure oxygen gas
 - B. In a covalent compound with nitrogen
 - C. In an ionic compound with calcium
 - D. All of the above are equally likely
- (3) When aluminum metal is exposed to air, an aluminum oxide coating forms and protects the metal underneath. Which reaction best describes the formation of an oxide coating on aluminum metal?
- A. $\text{Al(s)} + \text{O(g)} \rightarrow \text{AlO(s)}$
 - B. $\text{Al(s)} + \text{O}_2\text{(g)} \rightarrow \text{AlO}_2\text{(s)}$
 - C. $3\text{Al(s)} + \text{O}_2\text{(g)} \rightarrow \text{Al}_3\text{O}_2\text{(s)}$
 - D. $4\text{Al(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Al}_2\text{O}_3\text{(s)}$

- (4) Four potential Lewis structures for phosgene, COCl_2 , are shown below with all lone pairs omitted. Which Lewis structure best describes the bonds in phosgene?

Diagram	Lewis Structure
1	
2	
3	
4	

- A. Diagram 1
B. Diagram 2
C. Diagram 3
D. Diagram 4
- (5) When humans digest food it travels from the stomach, where the pH is roughly 2.5, to the small intestine, where the pH is 7.5. What is true of the small intestine?
- A. It does not have an excess of H^+ ions or OH^- ions
B. It has a higher concentration of H^+ ions than the stomach
C. It has a higher concentration of OH^- ions than the stomach
D. It is five times more basic than the stomach
- (6) Which statement **must** be true of the reversible reaction shown below?

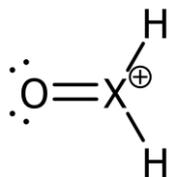


- A. The forward reaction and reverse reaction occur at the same rate
 B. The reverse reaction is endothermic
 C. The transition state of the forward reaction is more stable than that of the reverse reaction
 D. Both B and C
- (7) Four compounds are shown below on a scale from most ionic to most covalent bonding. Based on the second and third rows of the periodic table, where does sulfur difluoride, SF_2 , fit on this scale?



- A. Location 1
 B. Location 2
 C. Location 3
 D. Location 4
- (8) A chemical reaction has an activation energy of 100 kJ and ΔE equal to -25 kJ. What is the activation energy of the reverse reaction?
- A. 25 kJ
 B. 75 kJ
 C. 100 kJ
 D. 125 kJ

(9) Lewis structure of H_2XO^+ is shown below. What element does X represent?



- A. Boron
- B. Carbon
- C. Nitrogen
- D. Oxygen

(10) Aluminum chlorohydrate, $\text{Al}_2\text{Cl}(\text{OH})_5$, is used in many deodorants because it plugs sweat ducts. Roughly 8×10^{20} atoms of aluminum are used to make one stick of deodorant. How many atoms of oxygen are needed to make enough aluminum chlorohydrate for one stick of deodorant?

- A. 2×10^{21} atoms
- B. 4×10^{20} atoms
- C. 4×10^{21} atoms
- D. 8×10^{20} atoms

Answer Key

See how you did! Check out the answers below.

- (1) D
- (2) D
- (3) D
- (4) A
- (5) C
- (6) B
- (7) C
- (8) D
- (9) C
- (10) A