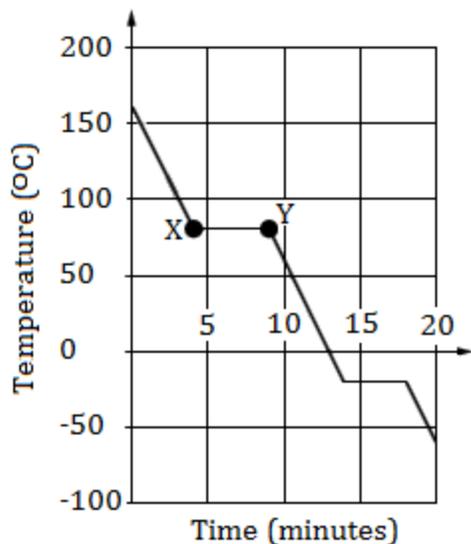


## North Carolina Final Exam Released Items from 2015

1. What is the chemical formula for magnesium bromate?  
(A) MgBr                      (B) MgBr<sub>2</sub>                      (C) MgBrO<sub>3</sub>                      (D) Mg(BrO<sub>3</sub>)<sub>2</sub>
2. How are compounds with metallic bonds similar to ionic compounds?  
(A) Both tend to have double and triple bonds.  
(B) Both tend to have low boiling points.  
(C) Both tend to have poor conductivity.  
(D) Both tend to have high melting points.
3. Which of these elements has the greatest atomic radius?  
(A) H                      (B) N                      (C) Cl                      (D) Cs
4. How does the amount of heat energy change as a 250 gram sample of water is heated from 5.0°C to 30.0°C?  
(A) The amount of heat energy changes, causing the water to sublime.  
(B) The amount of heat energy changes, causing the water to evaporate.  
(C) As the temperature increases, the amount of heat energy decreases.  
(D) As the temperature increases, the amount of heat energy increases.

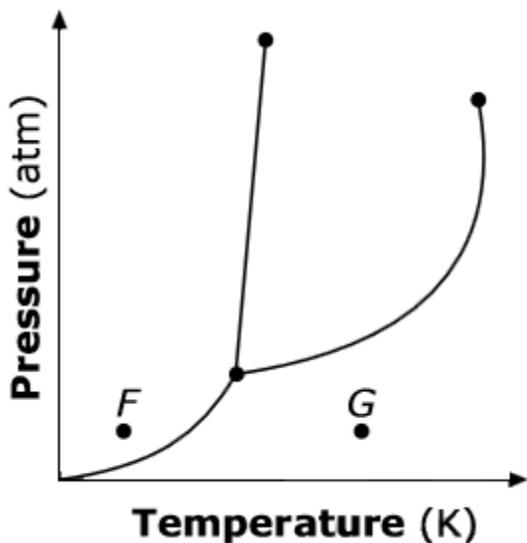
5. This graph represents data collected when a sample of gas is uniformly cooled from 155°C. Why does the temperature of the sample remain constant between point X and point Y?

Cooling Curve of a Gas



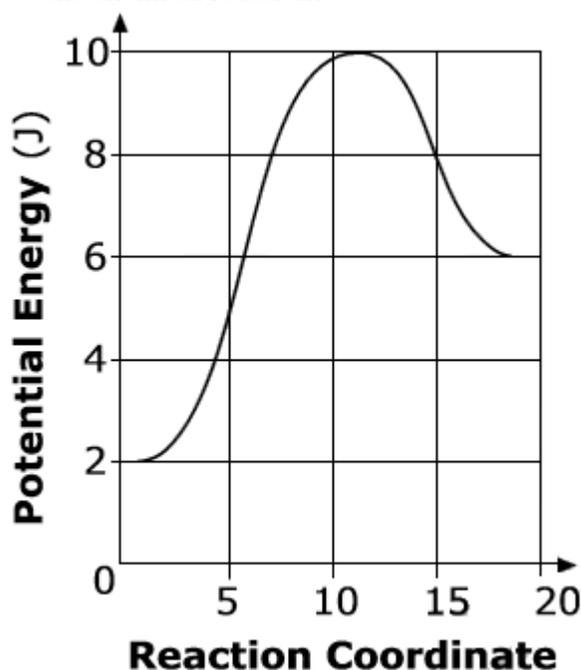
- (A) because the sample is transitioning from a gaseous state to a solid state
- (B) because the sample is transitioning from a gaseous state to a liquid state
- (C) because the sample is transitioning from a solid state to a gaseous state
- (D) because the sample is transitioning from a liquid state to a solid state

6. The phases of a substance under various pressure and temperature combinations are shown on this phase diagram. What occurs if the pressure of the substance at point F remains constant, and the temperature increases to point G?



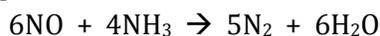
- (A) It will transition from a solid state to a liquid state.  
 (B) It will transition from a liquid state to a solid state.  
 (C) It will transition from a solid state to a gaseous state.  
 (D) It will transition from a gaseous state to a solid state.

7. The potential energy diagram of a chemical reaction is shown below. Which best describes the energy in the chemical reaction?



- (A) Heat energy was released.  
 (B) Energy was lowered by a catalyst.  
 (C) 8 J of energy were required to start the reaction.  
 (D) 10 J of energy were required to start the reaction.

8. This balanced chemical equation represents a chemical reaction:



What volume of  $\text{NH}_3$  gas, at Standard Temperature and Pressure (STP), is required to react with 15.0 g of  $\text{NO}$ ?

- (A) 5.68 L                      (B) 7.47 L                      (C) 10.0 L                      (D) 11.2 L

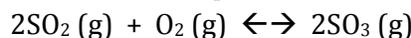
9. The equation represents a chemical reaction at equilibrium:



What happens to the system when the temperature is decreased?

- (A) The reaction shifts toward the right, and the amount of hydrogen gas increases.
- (B) The reaction shifts toward the right, and the amount of hydrogen gas decreases.
- (C) The reaction shifts toward the left, and the amount of hydrogen gas increases.
- (D) The reaction shifts toward the left, and the amount of hydrogen gas decreases.

10. This equation represents a chemical reaction at equilibrium:



What will happen when the concentration of  $\text{SO}_3$  is increased?

- (A) The reaction shifts to the right, and the concentrations of  $\text{SO}_2$  (g) and  $\text{O}_2$  (g) decrease.
- (B) The reaction shifts to the right, and the concentrations of  $\text{SO}_2$  (g) and  $\text{O}_2$  (g) increase.
- (C) The reaction shifts to the left, and the concentrations of  $\text{SO}_2$  (g) and  $\text{O}_2$  (g) decrease.
- (D) The reaction shifts to the left, and the concentrations of  $\text{SO}_2$  (g) and  $\text{O}_2$  (g) increase.

11. A student conducts an experiment to identify the pH of some common household substances. The data is recorded in this table.

pH Values for Common Household Substances

Substance	pH
Ammonia	11.9
Drain Cleaner	13.5
Hand Soap	10.1
Lemon Juice	2.3
Vinegar	3.0
Water	6.8

Which substance would be classified as containing the highest concentration of hydroxide ions?

- (A) ammonia      (B) drain cleaner      (C) lemon juice      (D) vinegar

12. A newly synthesized ionic compound is placed in water to make an aqueous solution. Which best describes the new ionic solution?

- (A) The ionic solution conducts electricity.
- (B) The ionic solution dissolves nonpolar solutions.
- (C) The ionic solution cannot conduct electricity.
- (D) The ionic solution is a neutral solution.

13. Why is potassium chloride able to dissolve in water?

- (A) because potassium ions are attracted to the partial negative charge of hydrogen
- (B) because potassium ions are attracted to the partial positive charge of hydrogen
- (C) because potassium ions are attracted to the partial negative charge of oxygen
- (D) because potassium ions are attracted to the partial positive charge of oxygen

14. Which occurs if an electron transitions from  $n = 5$  to  $n = 2$  in a hydrogen atom?

- (A) Energy is absorbed, and visible light is emitted.
- (B) Energy is released, and visible light is emitted.
- (C) Energy is released, and visible light is not emitted.

(D) Energy is absorbed, and visible light is not emitted.

15. When a gamma ray is emitted by an element, what happens to the atomic mass and the atomic number?

- (A) The atomic mass stays the same, and the atomic number stays the same.
- (B) The atomic mass changes, and the atomic number stays the same.
- (C) The atomic mass stays the same, and the atomic number changes.
- (D) The atomic mass changes, and the atomic number changes.

16. How does a single covalent bond between two carbon atoms compare to a double covalent bond between two carbon atoms?

- (A) A single covalent bond is stronger and has a longer bond length than a double covalent bond.
- (B) A single covalent bond is stronger and has a shorter bond length than a double covalent bond.
- (C) A single covalent bond is weaker and has a shorter bond length than a double covalent bond.
- (D) A single covalent bond is weaker and has a longer bond length than a double covalent bond.

17. How do the three isotopes Sn-116, Sn-118, and Sn-119 differ?

- (A) Sn-116 has 166 neutrons, Sn-118 has 168 neutrons, and Sn-119 has 169 neutrons.
- (B) Sn-116 has 116 neutrons, Sn-118 has 118 neutrons, and Sn-119 has 119 neutrons.
- (C) Sn-116 has 66 neutrons, Sn-118 has 68 neutrons, and Sn-119 has 69 neutrons.
- (D) Sn-116 has 50 neutrons, Sn-118 has 52 neutrons, and Sn-119 has 53 neutrons.

18. Which molecule contains a triple bond?

- (A)  $F_2$
- (B)  $O_2$
- (C)  $Cl_2$
- (D)  $N_2$

19. Which of these compounds will form a precipitate when mixed with an aqueous solution of sodium sulfate,  $Na_2SO_4$ ?

- (A)  $LiNO_3$
- (B)  $KNO_3$
- (C)  $Mg(NO_3)_2$
- (D)  $Ba(NO_3)_2$

20. Solid chromium (II) reacts with oxygen gas to form solid  $CrO$ . What is this type of reaction?

- (A) decomposition
- (B) synthesis
- (C) single replacement
- (D) double replacement

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All of the questions above are from:

<http://www.ncpublicschools.org/docs/accountability/testing/releasedforms/chemreleased15.pdf>

[Click here to get the answers and explanations to these questions](#)