

Chapter 5+6 Practice Test

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Science 10: Chemistry II Practice Test



NAME: _____

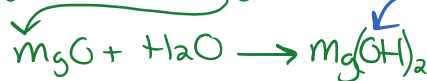
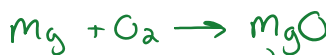
BLOCK: _____

Multiple Choice:

Circle the letter of the best answer. You may refer to a periodic table and an ion chart.

- What type of reaction is the following?
silver + gold(III) nitrate → silver nitrate + gold
A. synthesis
B. neutralization
C. single replacement
D. double replacement
- What type of reaction is the following?
 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
A. single replacement
B. combustion
C. decomposition
D. double replacement
- Classify the reaction type and predict the products of the following reaction.
 $HCl + Mg(OH)_2 \rightarrow ?$ *MgCl₂ + H₂O*
A. double replacement; products are MgCl and H(OH)₂
B. double replacement; products are MgCl₂ and H₂O
C. neutralization; products are MgCl and H(OH)₂
D. neutralization; products are MgCl₂ and H₂O
HCl + Mg(OH)₂ → acid + base → salt + water
- Which of the following reactions is double replacement?
A. $Pb + 2CuCl_2 \rightarrow PbCl_2 + 2Cu$ *single rep.*
B. $Na_2CO_3 + CaBr_2 \rightarrow CaCO_3 + 2NaBr$ *double.*
C. $MgCO_3 + 2HBr \rightarrow MgBr_2 + CO_2 + H_2O$ *neutralization*
D. $Mg(OH)_2 + 2HBr \rightarrow MgBr_2 + 2H_2O$ *neutralization*
- What are the products in the decomposition reaction involving aluminum oxide?
A. Al and O
B. Al₂O₃
C. Al and O₂
D. AlO
 $Al_2O_3 \rightarrow Al + O_2$
H O F B r I N C l
- What is formed when HCl and NaOH solutions are combined?
A. NaCl and H₂O
B. NaH and ClOH
C. NaOCl and H₂
D. There is no reaction.
 $HCl + NaOH \rightarrow H_2O + NaCl$

6. Which of the following household items is basic?
 A. baking soda
 B. grapes
 C. bananas
 D. water
7. What are the colours of methyl red indicator and bromothymol blue indicator in separate samples of water at pH 7?
 A. Methyl red indicator is red, and bromothymol blue indicator is yellow.
 B. Methyl red indicator is yellow, and bromothymol blue indicator is blue.
 C. Methyl red indicator is yellow, and bromothymol blue indicator is green.
 D. Methyl red indicator is orange, and bromothymol blue indicator is green.
8. Which are properties characteristic of an acid but not a base?
 A. sour, reacts with magnesium, turns litmus blue
 B. bitter, reacts with magnesium, turns litmus red
 C. slippery touch, does not react with magnesium, turns litmus blue
 D. sour, turns phenolphthalein indicator colourless, turns litmus red
9. What the best chemical definition of a salt?
 A. a material found by evaporating sea water
 B. a material formed by the reaction of an acid with a base.
 C. a material containing a metal ion and an oxide ion
 D. a material containing a metal ion and carbonate ion
10. Burning magnesium in air produces a brilliant white flame and a white powder. When the white powder is placed in water, it dissolves. What is the colour when bromothymol blue indicator is added to this solution?
 A. colourless
 B. yellow
 C. green
 D. blue



Forms a base

Match the Term on the left with the best Descriptor on the right.
 Each Descriptor may be used only once.

Term	Descriptor
<u>F</u> 11. synthesis	A. a reaction in which a compound splits into two elements - decomposition
<u>D</u> 12. precipitate	B. the reaction involving a burning candle
<u>B</u> 13. combustion	C. the reaction of an acid with a base
14. surface area	D. a solid that forms when two ionic solutions are mixed
<u>C</u> 15. neutralization	E. a substance that increases reaction rate without being used up by the reaction - catalyst
	F. a reaction in which two elements combine to form a compound

Match the Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.	
Term	Descriptor
<u>C</u> 11. indigo carmine	A. releases OH ⁻ ions in solution
<u>A</u> 13. base	B. releases H ⁺ ions in solution
<u>B</u> 14. acid	C. acid-base indicator
<u>G</u> 15. concentration	D. a set of numbers that measure acidity levels
<u>D</u> 16. pH scale	E. a liquid capable of dissolving other substances
	F. turns red in acid
	G. a measure of the quantity of a substance dissolved in a given volume

Short Answer Questions

17. Identify each of the following descriptions as synthesis, decomposition, single replacement, double replacement, neutralization, or combustion.

(a) There is only one reactant. decomposition

(b) One reactant is an element. The other is a compound. single replacement

(c) Two ionic compounds react to form two new ionic compounds. double replacement (neutralization if the compounds were an acid + base)

~~18. Which of the four factors affecting reaction rate is most important in each question below?~~

~~Choose from among concentration, temperature, surface area, and catalyst.~~

~~(a) Dust in a granary explodes when it comes in contact with a spark. _____~~

~~(b) Table sugar is digested in the mouth when it dissolves in saliva, which contains a digestive enzyme. _____~~

~~(c) A person blows on a fire to help get it burning better. _____~~

19. Complete **and balance** each of the following equations. Then **classify each reaction type**.

(a) $\text{Zn} + \text{Cu}(\text{OH})_2 \rightarrow \text{Zn}(\text{OH})_2 + \text{Cu}$

Reaction type: single replacement.

(b) $\text{C}_2\text{H}_4 + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$

Reaction type: combustion

(c) $16\text{Al} + 3\text{S}_8 \rightarrow 8\text{Al}_2\text{S}_3$

Reaction type: synthesis.

Synthesis

2. Write a **balanced chemical equation** to represent each reaction described below.

(a) Aluminum metal reacts with oxygen to form aluminum oxide.



(b) Metallic zinc combines with sulphur to form zinc sulphide.



Decomposition

2. Write a balanced chemical equation to represent each reaction described below.

(a) Rubidium oxide decomposes into its elements.



(b) Calcium chloride decomposes into its elements.



single replacement

2. Write a **balanced chemical equation** to represent each reaction described below.

(a) Silver reacts with gold(III) nitrate.



(b) Copper reacts with lead(II) sulphate.



Double Replacement

2. Write a balanced chemical equation to represent each reaction described below.

(a) Solutions of sodium hydroxide and hydrochloric acid react.



(b) A silver nitrate solution reacts with a sodium chloride solution.



Combustion

2. Write a balanced chemical equation to represent each reaction described below.

(a) Candle wax, $\text{C}_{25}\text{H}_{52}$, is burned to produce carbon dioxide and water.



(b) Sucros $\text{C}_{12}\text{H}_{22}\text{O}_{11}$, is burned to produce carbon dioxide and water.



17. Determine whether the following are acids, bases, or neither. Then, predict the colour they would turn litmus paper.

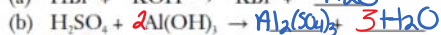
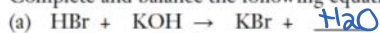
	Compound	Acid, Base or Neither?	Litmus Colour
(a)	H ₂ SO ₄	acid	Red
(b)	HCl	acid	Red
(c)	Ca(OH) ₂	base	blue

Litmus
Acid - Red
Base - Blue

18. Complete the following chart.

Indicator	Colour at pH 4	Colour at pH 7	Colour at pH 10
Methyl Red	Red	Yellow	Yellow
Bromthymol Blue	Yellow	Green	Blue

19. Complete and balance the following equations.



- (c) The reactions in (a) and (b) are both of the same type. What is the name of this type of reaction? neutralization

What to Do

Classify each reaction as a synthesis (S), decomposition (D), single replacement (SR), double replacement (DR), or combustion (C) reaction. Then, balance each equation.

	Reaction	Classification
1.	$\text{Li} + \text{AlCl}_3 \rightarrow \text{Al} + \text{LiCl}$	single replacement
2.	$\text{NH}_3 \rightarrow \text{N}_2 + \text{H}_2$	decomposition
3.	$\text{K} + \text{Br}_2 \rightarrow \text{KBr}$	synthesis
4.	$\text{C}_{10}\text{H}_{22} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	combustion
5.	$\text{NH}_4\text{OH} + \text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + (\text{NH}_4)_2\text{CO}_3$ <i>base acid</i>	neutralization
6.	$\text{H}_2\text{O} \rightarrow \text{H}_2 + \text{O}_2$	decomposition
7.	$\text{Al} + \text{Cl}_2 \rightarrow \text{AlCl}_3$	synthesis
8.	$\text{Zn} + \text{SnF}_4 \rightarrow \text{Sn} + \text{ZnF}_2$	single replacement
9.	$\text{Ni} + \text{HCl} \rightarrow \text{NiCl}_2 + \text{H}_2$	single replacement
10.	$\text{Au(CN)}_3 + \text{Zn} \rightarrow \text{Au} + \text{Zn(CN)}_2$	single replacement

20. Classify each reaction as either endothermic or exothermic, and briefly explain your answer.

Description of Chemical Reaction	Endothermic or Exothermic?	Explanation
A piece of paper is ignited and burns with a bright flame.	EXO	burning → heat produced.
Pentaborane (a colourless liquid), B_5H_9 , reacts violently with oxygen gas to form solid diborane, B_2O_3 , and water, typically bursting into flame and often exploding.	EXO	combustion reaction = burning = heat produced
Pure iron metal is formed and carbon dioxide is released when iron(III) oxide ore is heated to a very high temperature in the presence of solid carbon.	ENDO	reaction required an energy (heat) input to change reactants into products.
Sodium hydroxide solution and hydrochloric acid solution are mixed. The temperature of the mixture increases.	EXO	Temp ↑ means heat was produced.
Mixing ammonium thiocyanate and barium hydroxide octahydrate in a beaker causes water on the outside of the beaker to freeze.	ENDO	Temp ↓ means heat decreased.

Demo from class!

21. A student claims that the ^{combustion:} reaction of butane gas and oxygen gas must be endothermic since a spark is needed to ignite the butane gas in a lighter. Do you agree or disagree with this claim? Explain your answer.

- Disagree.
- The spark is the "activation energy" required to start the reaction.
- Combustion reactions = exothermic because heat/energy is produced.