Chemistry 11

ANSWERS

Simple Synthesis and Decomposition Reactions Worksheet

Instructions:

1. Identify the reaction type by writing S or D in the margin to the left.
2. Provide the correct chemical formulae for reactants and/or products where necessary.
3. Use the simplest whole number coefficients to balance the chemical equations.

Simple Synthesis Reactions:	element + element	→	compound
Simple Decomposition Reactions:	compound	→	element + element

S 1. The first step in the production of sulfuric acid is to burn sulfur.

$S_{8(s)} + 12O_{2(g)} \rightarrow 8\ SO_{3(g)}$

D 2. In 1774, Joseph Priestley discovered oxygen by decomposing the calx of mercury.

$2HgO_{(s)} \rightarrow 2Hg_{(l)} + O_{2(g)}$

D 3. Molten table salt is industrially decomposed to produce molten sodium.

$2NaCl_{(l)} \rightarrow 2Na_{(l)} + Cl_{2(g)}$

S 4. Nitrogen from the air reacts with hydrogen to produce ammonia for fertilizers.

$N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

S 5. Rocket fuel burns to propel a satellite into space.

$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$

D 6. Copper ore is decomposed to remove the copper metal.

$2CuO_{(s)} \rightarrow 2Cu_{(s)} + O_{2(g)}$

S 7. Barbecue charcoal undergoes incomplete combustion to produce deadly carbon monoxide.

$2C_{(s)} + O_{2(g)} \rightarrow 2CO_{(g)}$

S 8. Freshly cut lithium reacts with nitrogen from the air.

$6Li_{(s)} + N_{2(g)} \rightarrow 2Li_3N_{(s)}$

S 9. A silver spoon or coin tarnishes when exposed to sulfur.

$Ag_{(s)} + S_{(g)} \rightarrow AgS_{(s)}$

S 10. Solid barium oxide is added to water.

$BaO_{(s)} + H_2O_{(l)} \rightarrow Ba(OH)_{2(aq)}$

D 11. Sulfurous acid dissociates because it is a weak acid.

$H_2SO_{2(aq)} \rightarrow HSO_{2(aq)}^- + H^+_{(aq)}$

D 12. Solid zinc carbonate is heated.

$ZnCO_{3(s)} \rightarrow ZnO_{(s)} + CO_{2(g)}$

S 13. Copper (II) chloride reacts with oxygen.

$CuCl_{2(s)} + 3O_{2(g)} \rightarrow Cu(ClO_3)_{2(s)}$

S 14. Carbon dioxide gas is bubbled through water.

$CO_{2(g)} + H_2O_{(l)} \rightarrow H_2CO_{3(aq)}$

S 15. Sodium nitrate is produced.

$NaO_{(s)} + NO_{2(g)} \rightarrow NaNO_{3(s)}$

Answer Key

WORKSHEET ON SINGLE & DOUBLE REPLACEMENT REACTIONS

Predict the products. Write formulas. **If there is no reaction, then just put NO RXN.**

Single Replacement: **A + BC → B + AC or A + BC → C + BA (when A and C are negative ions)**

1. Zinc + Hydrogen chloride → H_2 + $ZnCl_2$
2. Magnesium + Hydrogen Sulfate → $MgSO_4$ + H_2
3. Copper (II) chloride + Flourine → CuF_2 + Cl_2
4. Silver + Sodium Hydroxide → No RxN
5. Potassium iodide + Bromine → KBr + I_2
6. Calcium + Hydrogen hydroxide → $Ca(OH)_2$ + H_2
7. Iron IV oxide + Hydrogen → Fe + H_2O

Double Replacement: AB + CD → AD + CB

1. Barium chloride + Aluminum sulfate → $BaSO_4$ + $AlCl_3$
2. Calcium nitride + water → $Ca(OH)_2$ + HNO_3
3. Calcium hydroxide + Hydrogen phosphate → $Ca_3(PO_4)_2$ + H_2O
4. Hydrogen sulfate + Sodium hydrogen carbonate → H_2CO_3 + Na_2SO_4
5. Calcium hydroxide + Ammonium chloride → $CaCl_2$ + NH_4OH
6. Potassium iodide + Lead II Nitrate → KNO_3 + PbI_2
7. Sodium acetate + Calcium sulfide → Na_2S + $Ca(C_2H_3O_2)_2$

Complete each word equation, write formulas. Then identify and place the type of reaction (single replacement or double replacement) in the blank provided. Be sure to Check if a Single Replacement reaction will occur.

SR 1. Zinc + Silver nitrate → Ag + $Zn(NO_3)_2$

SR 2. Aluminum + Hydrogen chloride → $AlCl_3$ + H_2

DR 3. Magnesium oxalate + Ammonium carbonate → $MgCO_3$ + $(NH_4)_2C_2O_4$

SR 4. Calcium + Aluminum nitrate → $Ca(NO_3)_2$ + Al

DR 5. Potassium flouride + Lead (II) Nitrate → KNO_3 + PbF_2

DR 6. Calcium bromide + Silver nitrate → $Ca(NO_3)_2$ + $AgBr_2$

DR 7. Ammonium phosphate + Barium acetate → $NH_4C_2H_3O_2$ + $Ba_3(PO_4)_2$

SR 8. Sodium chloride + Potassium → Na + KCl

DR 9. Magnesium nitrate + ammonium chloride → $MgCl_2$ + NH_4NO_3

SR 10. Iron (III) chlorate + calcium → $Ca(ClO_3)_2$ + Fe

SR 11. Chlorine + Sodium bromide → NaCl + Br_2

DR 12. Potassium chloride + Silver nitrate → KNO_3 + AgCl

DR 13. Calcium hydroxide + Hydrogen nitrate → $Ca(NO_3)_2$ + H_2O

DR 14. Lead II nitrate + Potassium chloride → $PbCl_2$ + KNO_3

DR 15. Strontium carbonate + Hydrogen nitrate → H_2CO_3 + $Sr(NO_3)_2$

SR 16. Gold + Potassium nitrate → No Reaction

SR 17. Zinc + Silver nitrate → $Zn(NO_3)_2$ + Ag

SR 18. Aluminum + Copper II sulfate → $Al_2(SO_4)_3$ + Cu