

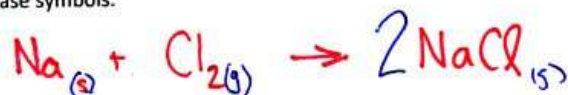
# ANSWERS



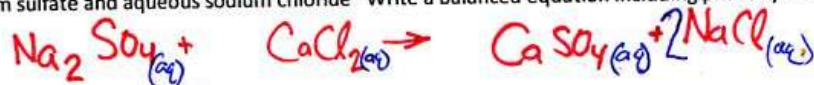
1. Write a balanced reaction for the combustion of  $C_3H_8$ .



2. Solid sodium reacts with chlorine gas to form solid sodium chloride. Write a balanced equation including phase symbols.

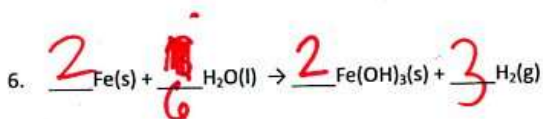


3. aqueous sodium sulfate reacts with aqueous calcium chloride to form aqueous calcium sulfate and aqueous sodium chloride. Write a balanced equation including phase symbols.



5. Solid aluminum oxide decomposes into solid aluminum and oxygen gas. Write a balanced equation including phase symbols.

Al



7. Solid magnesium and nitrogen gas combine to form solid magnesium nitride. Write a balanced equation including phase symbols.



8. What does the Law of Conservation of Mass say must ALWAYS ALWAYS ALWAYS be true about the mass of the Reactants in any reaction in the history of the entire Universe?

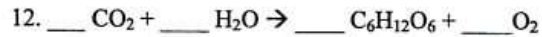
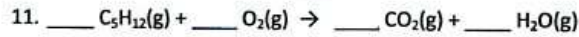
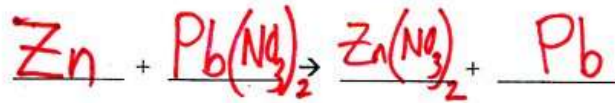
total reactant mass  
must equal  
total product mass

the mass on the left of the arrow equals mass on right  
 $A + B \rightarrow C + D$

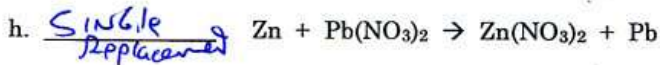
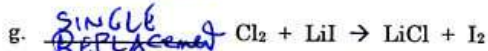
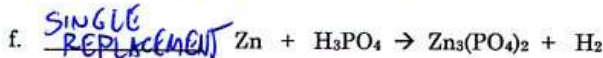
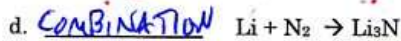
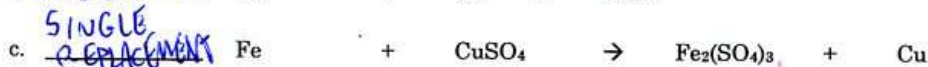
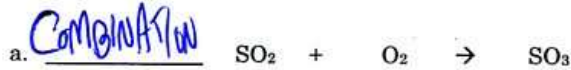
9. When solid potassium chlorate is strongly heated in a flame it forms oxygen gas and solid potassium chloride.



10. Zinc and lead (II) nitrate react to form zinc nitrate and lead.



13. classify each of the reactions below as one of the following reaction types  
COMBUSTION, SINGLE REPLACEMENT,  
DECOMPOSITION, DOUBLE REPLACEMENT,  
COMBINATION,



If the statement is False, write a word in the blank to make it True.

1.  True  False Thomson's glass tube glowed on the end because it was being hit with atoms

"electrons"

2.  True  False If a neutral atom loses electrons it will become a cation

Here is a plum pudding drawing of one neutral ATOM of **Element X**



7. If this is one atom of **Element X**, what is the charge of it?

(-3 -2 -1 neutral +1 +2 +3)

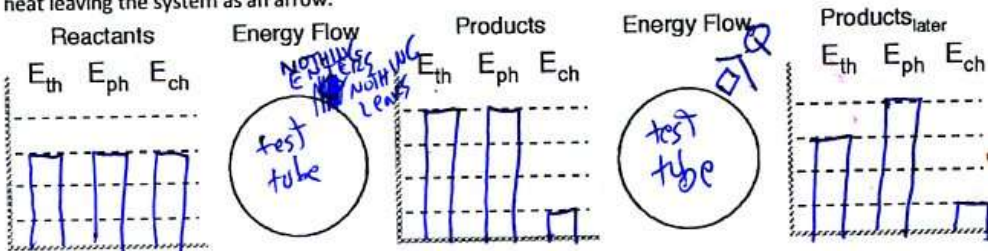


If this is one atom of **Element X**, what is the charge of it?

(-5 -2 -1 neutral +1 +2 +5)



4. When 3M HCl is added to solid sodium carbonate, the contents of the test tube immediately starts bubbling and gets warm. Carbon dioxide gas, water vapor and sodium chloride are formed. In the LOL diagram below you should first show chemical energy changing to thermal energy and then in a separate step show heat leaving the system as an arrow.



6. What type of reactions are the following?

Matching. Use each choice once. What type of reactions are shown here?		
<u>C</u>	$AB + C \rightarrow CB + A$	a) combination (sometimes called synthesis)
<u>A</u>	$A + B \rightarrow AB$	b) decomposition
<u>B</u>	$AB \rightarrow A + B$	c) single replacement
<u>D</u>	$AB + CD \rightarrow CB + AD$	d) double replacement

14. In an endothermic reaction, is the energy of the products less than or greater than that of the reactants?

Greater

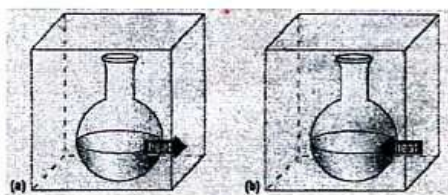
15. Convert each of the following energy units:

a. 8.1 kcal to cal  $8.1 \text{ kcal} \times \left( \frac{1000 \text{ cal}}{1 \text{ kcal}} \right) = 8100 \text{ calories}$

b. 2.50 kcal to J

$$2.50 \text{ kcal} \times \left( \frac{4186 \text{ J}}{1 \text{ kcal}} \right) = 10465 \approx 10500 \text{ J}$$





Some substances reacted in two flasks. For each statement below, choose either Reaction A or Reaction B

16. B For the substances in the reaction  $E_{ch}$  is decreasing
17. A The reaction could be written  $A + \text{energy} \rightarrow B$
18. A The reaction could be written  $A \rightarrow B \quad \Delta H = -500 \text{ kJ}$
19. B The  $\Delta H = +300 \text{ kJ}$
20. A The reaction is exothermic
21. B The reaction would feel cold if you held the flask in your hand.

#### Energy in Chemical Reactions

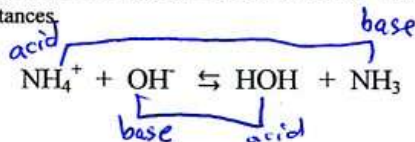
22. Classify the following as exothermic or endothermic:

- a. 550 kJ is released EXO **EXOTHERMIC**
- b. The energy level of the products is higher than that of the reactants. **ENDO**

23. Classify the following as exothermic or endothermic reaction and give  $\Delta H$  for each:

- a. Gas burning in a Bunsen burner:  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + 890 \text{ kJ}$   
**EXOTH**  $\Delta H = -890 \text{ kJ}$
- b. Dehydrating limestone:  $\text{Ca}(\text{OH})_2 + 65.3 \text{ kJ} \rightarrow \text{CaO} + \text{H}_2\text{O}$   
**ENDOTHERMIC**  $\Delta H = +65.3 \text{ kJ}$

24. In the reaction below, connect the conjugate pairs with a line. Write "acid" or "base" below each of the four substances.



x

25. Next to each, write its conjugate base:

