

Hydrocarbon Review

↓
made up of hydrogen and carbon

simplest hydrocarbon:

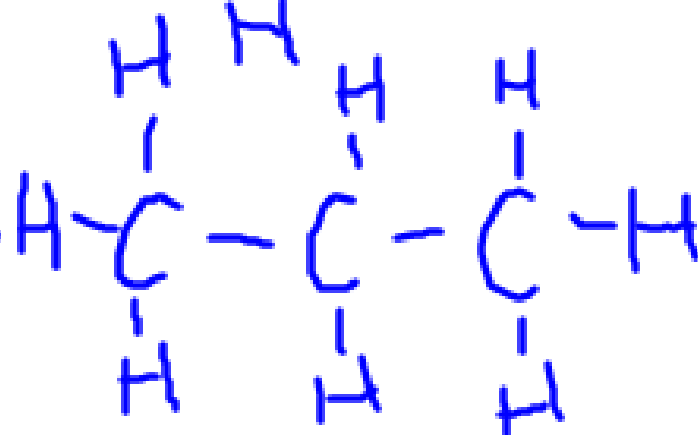
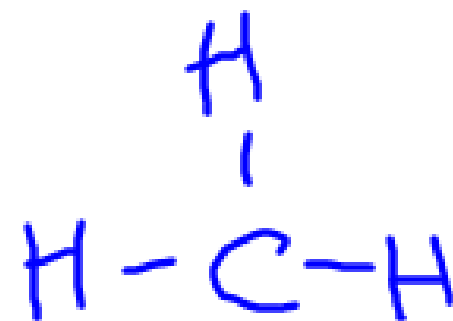
Alkane $C_n H_{2n+2}$

methane: $C_1 H_4$

ethane: $C_2 H_6$

propane: $C_3 H_8$

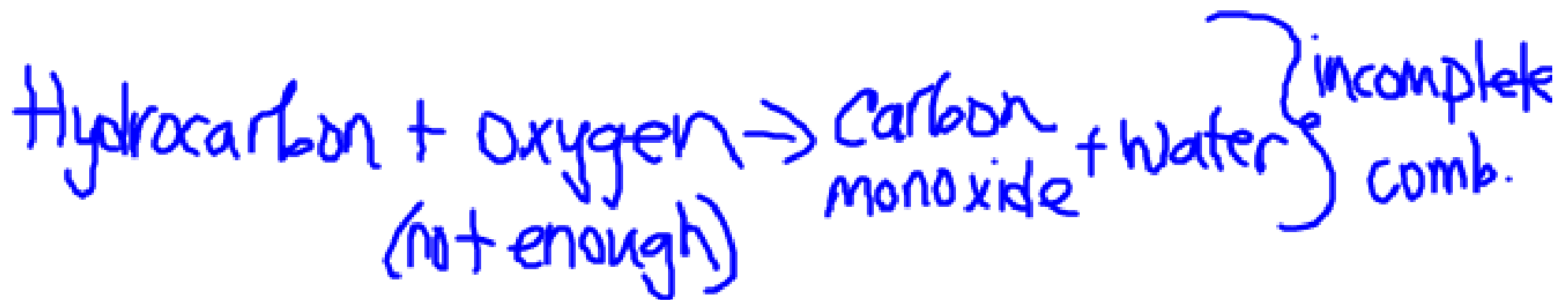
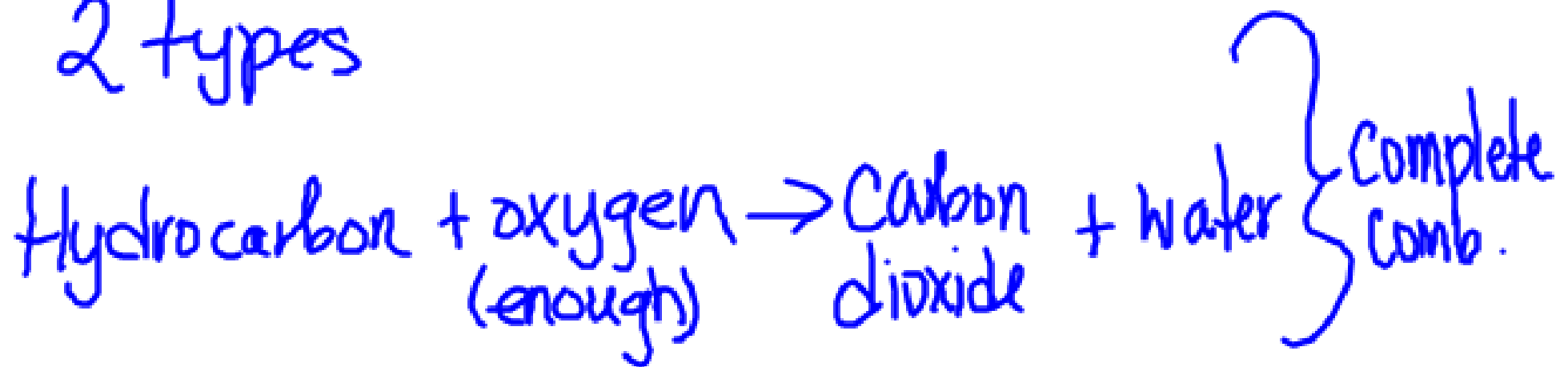
butane: $C_4 H_{10}$



Reaction Prediction - Types of Chemical Rxn

① Combustion

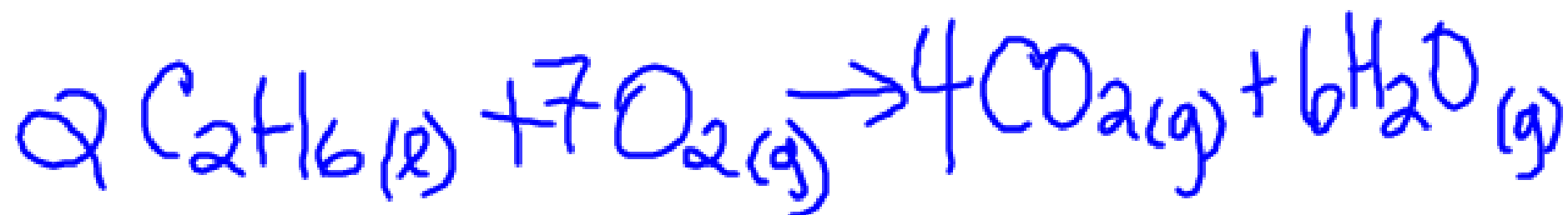
2 types



When a compound "burns in air" it means it is reacting with O_2 in the air.

Example: Predict the products + write the balanced chemical equation

① Ethane is burned in air



Type: complete combustion

② Propane is burned in the presence of not enough oxygen.

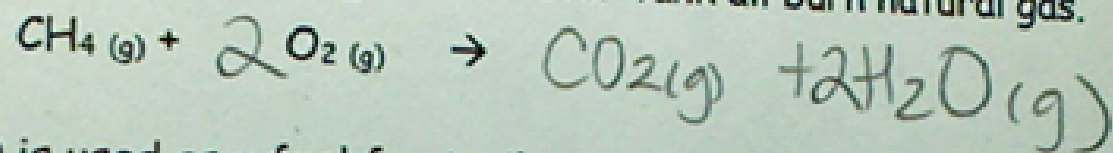


Type: incomplete combustion.

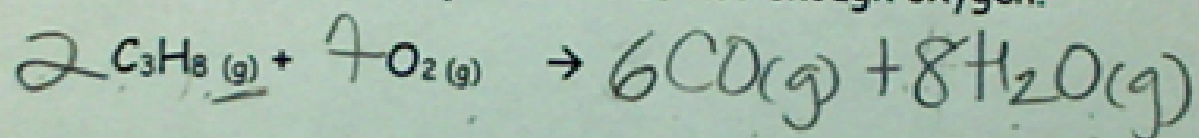
Complete Combustion Worksheet

Due to the heat produced in combustion reactions water is produced as a gas $\text{H}_2\text{O}(g)$. Also, all combustible hydrocarbons must be converted to the gas state before they will burn.

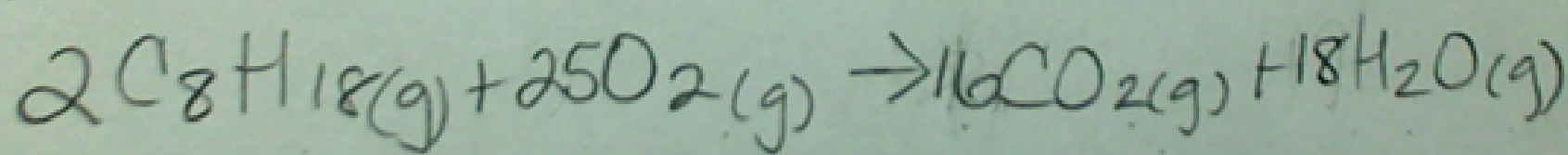
1. A Bunsen burner, gas furnace and gas hot-water tank all burn natural gas.



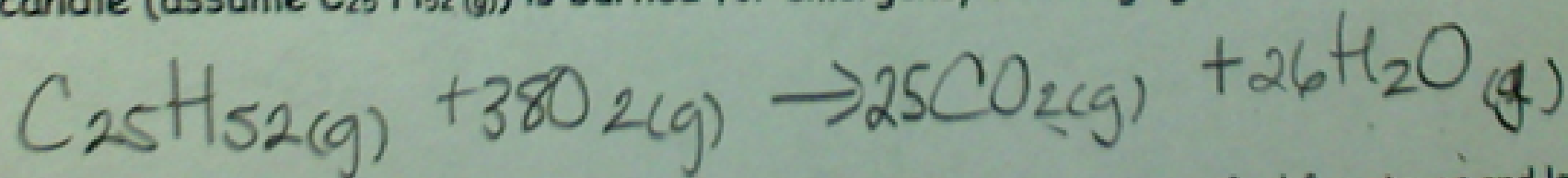
2. Propane ($\text{C}_3\text{H}_8(g)$) is used as a fuel for trailers and where natural gas is not available. However in this example it is burned in the presence of not enough oxygen.



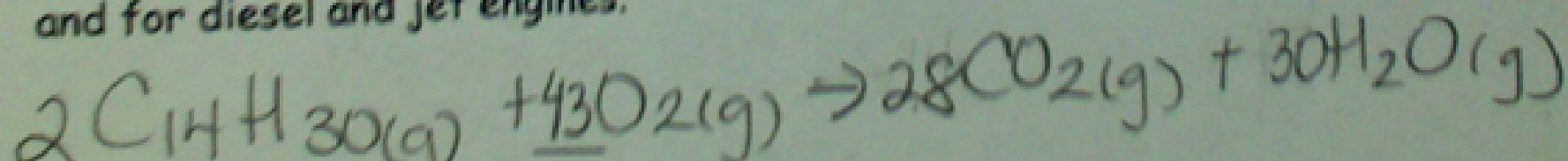
3. Gasoline ($\text{C}_8\text{H}_{18}(g)$) is mixed with air in the carburetor and then exploded by a spark in the cylinder of a car motor.



4. A candle (assume $\text{C}_{25}\text{H}_{52}(g)$) is burned for emergency or dining light.



5. Kerosene (assume $\text{C}_{14}\text{H}_{30}(g)$) is a mixture of hydrocarbons used as a fuel for stoves and lanterns and for diesel and jet engines.



② Synthesis Reaction (addition rxn)

General Formula : $A + B \rightarrow AB$

①

• Element + Element \rightarrow Compound

metal \rightarrow \leftarrow non-metal \leftarrow ionic compound

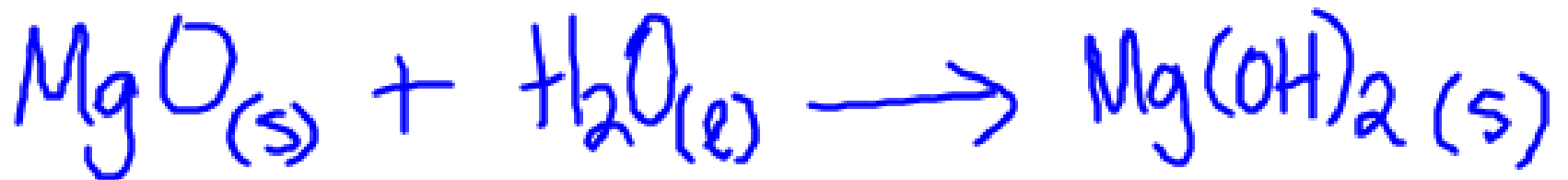
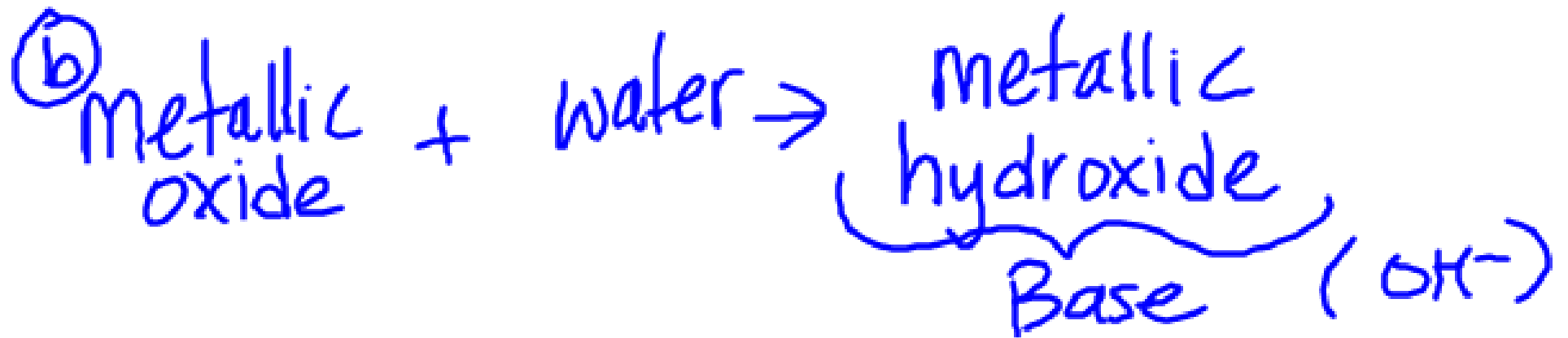
Ex : $2\text{Zn}_{(s)} + \text{O}_{2(g)} \rightarrow 2\text{ZnO}_{(s)}$

zinc + oxygen \rightarrow zinc oxide

Non-metals \rightarrow \leftarrow \leftarrow

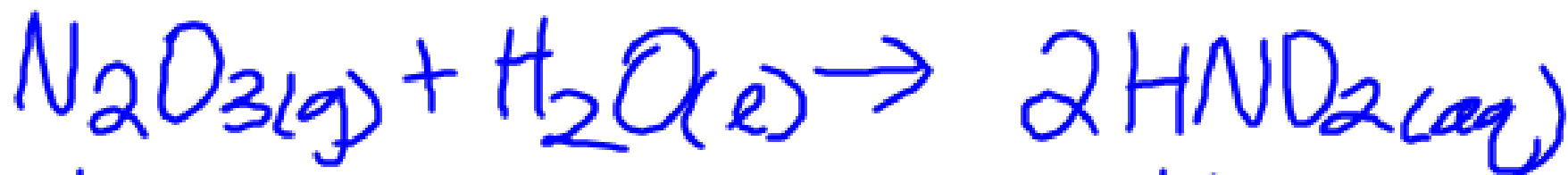
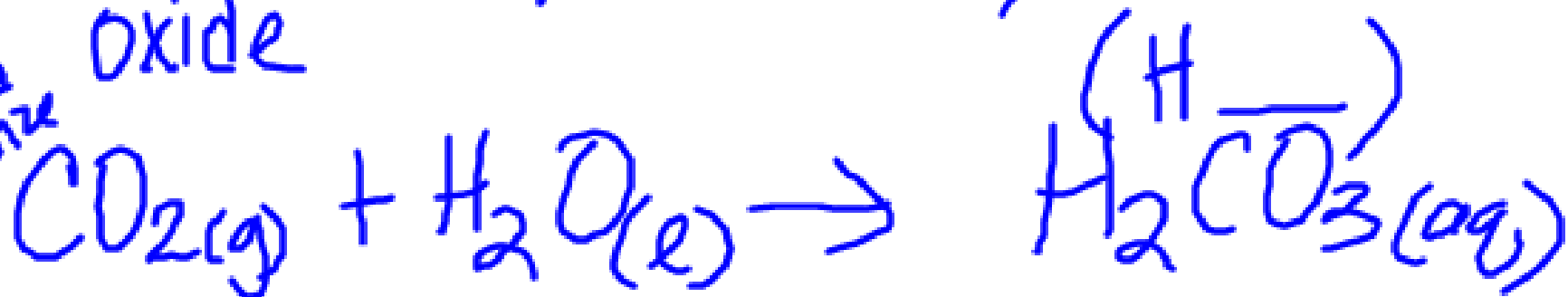
$\text{C}_{(s)} + 2\text{Cl}_{2(g)} \rightarrow \text{CCl}_4(g)$
Carbon + chlorine \rightarrow Carbon tetrachloride

• Compound + compound \rightarrow compound



① Nonmetallic oxide + water \rightarrow acid

Need
to
memorize



③ Decomposition

General Formula: $AB \rightarrow A + B$

12 ← • Binary Compound → Element + Element



④ _____ nitrates → _____ nitrite + oxygen

potassium nitrate → potassium nitrite + oxygen



⑥ _____ chlorate \rightarrow _____ chloride + oxygen

Copper (II) chlorate \rightarrow Copper (II) chloride + oxygen



⑦ _____ carbonate \rightarrow _____ oxide + carbon dioxide

magnesium carbonate \rightarrow magnesium oxide + carbon dioxide



Review Synthesis / ~~Decomposition~~

- Binary Compound \rightarrow Element + Element
(ionic or molecular)
- metal Carbonate \rightarrow metal oxide + Carbon dioxide
- metallic hydroxide \rightarrow metallic oxide + water
- acid \rightarrow non-metallic oxide + water
- chlorate \rightarrow chloride + oxygen
- nitrate \rightarrow nitrite + oxygen

Homework:

Synthesis & Decomposition
Pun Worksheet