

Chemistry Final Exam Free Response Version EE

You must show all work to receive full credit for an answer. No electronic devices are allowed to be used. In the event that you are caught using an electronic device your score will be cancelled and you will receive a zero.

limiting reagent: given both reactants

1. If the reaction is started with 1000.0 g N₂ and 500 g H₂, what amount of ammonia can be produced?

N2 + 3H2 -> 2NH3

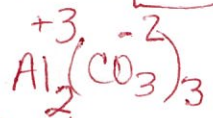
1000 g N ₂	1 mol N ₂ 28 g N ₂	2 mol NH ₃	17 g NH ₃	= 1214 ← amount produced
500 g H ₂	1 mol H ₂ 2 g H ₂	3 mol NH ₃	17 g NH ₃	

Balance!

2. A total of 7.0 moles of aluminum carbonate is dissolved in enough water to make 7.0 L of an aqueous solution.

Blue

A. Write the chemical formula for the solute in the solution.



gets dissolved
Solute: Al₂(CO₃)₃
Solvent: water
does the dissolving

B. Calculate the molarity of the solution.

$M = \frac{\text{mol}}{L} = \frac{7 \text{ mol}}{7 \text{ L}} = 1 \text{ M}$

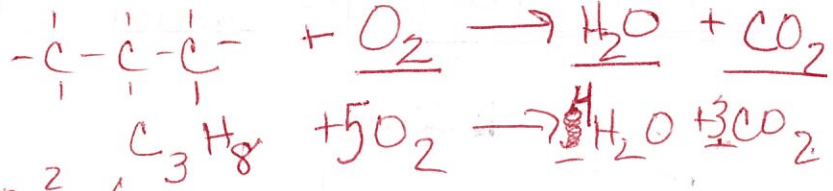
3. In a titration, 16.0 mL of 0.75 M H₂SO₄ is neutralized by 75.00 mL of KOH?

A. Write the balanced equation.
B. Calculate the molarity of the base.

organic - this is what will change

4. Translate the following word equation into properly balanced chemical equations.

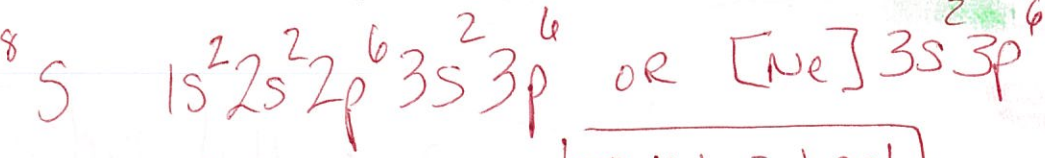
A. The combustion of propane.



5. Write the electron configuration for Si⁴⁺.



6. Write the electron configuration for S²⁻.



7. What volume of CO₂ at STP can be produced by the reaction if 12.0 g of NaHCO₃ is used?

Balance equation

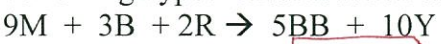
2NaHCO3 -> Na2CO3 + CO2 + H2O

12 g NaHCO ₃	1 mol NaHCO ₃ 84 g NaHCO ₃	1 mol CO ₂	22.4 L CO ₂
	2 mol NaHCO ₃	1 mol CO ₂	

Balance first!
Stoich question using STP!

= 1.6 L CO₂

8. Assume the following hypothetical reaction takes place:



The reaction of 7.89 mol of R produces 0.0349 mol of Y. Calculate the percent yield.

Read! DO you have hydronium or hydroxide

9. Determine the pH of the following hydroxide concentrations:

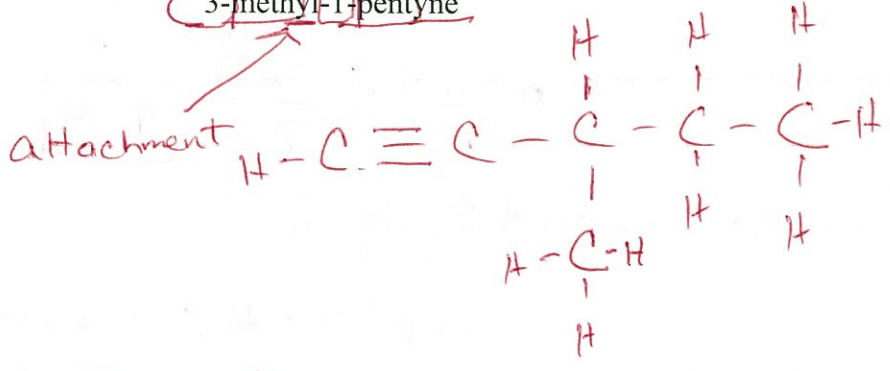
use log function

- A. 1×10^{-10} $pOH = 10$ $pH = 4$ (A)
- B. 3.7×10^{-4} $pOH = 3.43$ $pH = 10.57$ (B)
- C. 7.8×10^{-2}

$pOH = 1.10$ $pH = 12.9$ (C)

10. Draw the following :

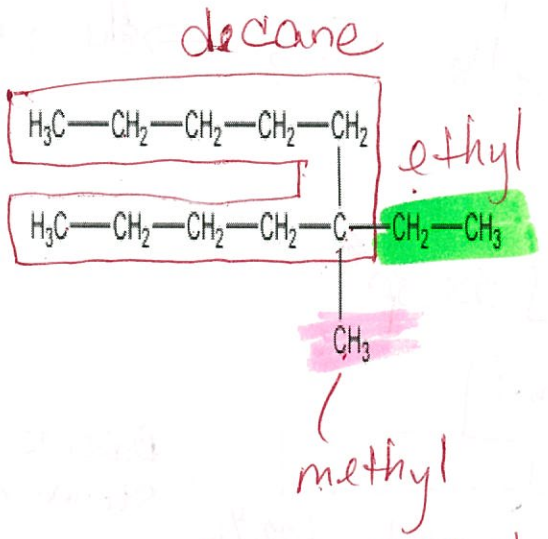
3-methyl-1-pentyne
 1 C, 5 carbon, triple



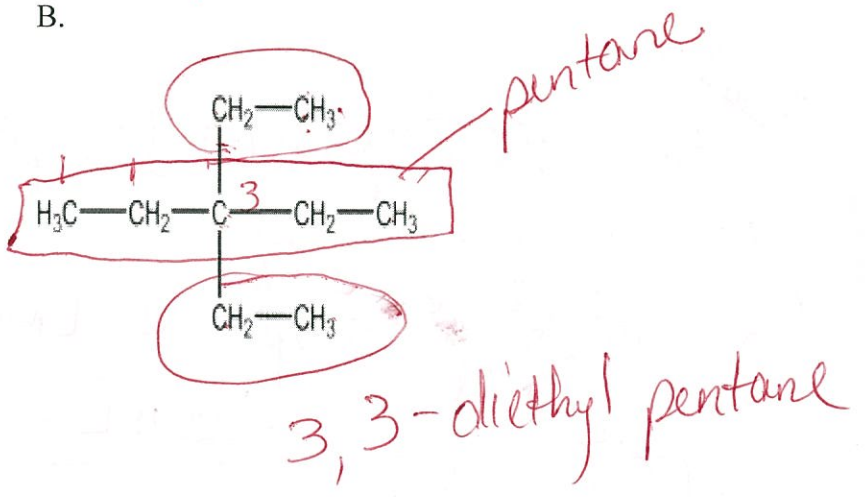
Extra Credit (5 pts) Graded as right or wrong.

11. Name the following:

A.



B.



5,5-ethyl methyl decane
 OR

5 ethyl-5-methyl decane

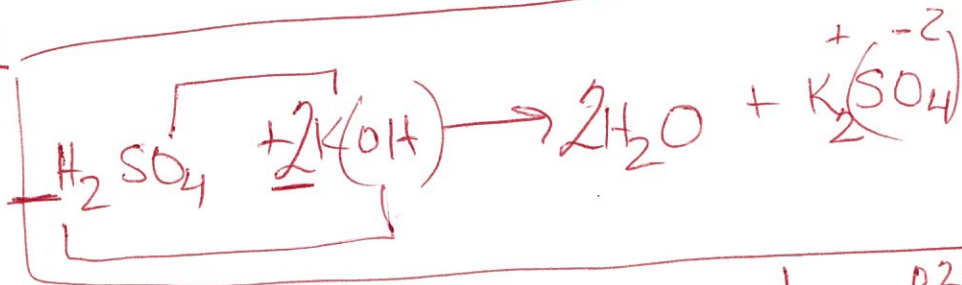
3. Acid H_2SO_4

Base KOH

$$M = \frac{\text{mol}}{L}$$

$$M = \frac{\text{mol}}{L} \quad M = ?$$

$$\frac{16. \text{ mL}}{.75 \text{ M}} = .016 \text{ L}$$



$$M = \frac{\text{mol}}{L}$$

$$M = \frac{\text{mol}}{L} = \frac{.024}{.075} = .32 \text{ M}$$

$$.75 = \frac{\text{mol}}{.016}$$

$$.012 = \text{mol } H_2SO_4$$

2

mol KOH = .024 mol KOH

1

mol H_2SO_4

8.

$$\% \text{ yield} = \frac{\text{actual}}{\text{theor.}} \times 100$$

this one you will do
stoich to find

use vocab like:
produces,
made,
yielded
obtain;
this is the
one given

$$7.89 \text{ mol R}$$

$$\frac{5 \text{ mol Y}}{10 \text{ mol R}}$$

=

$$39.45 \text{ mol Y}$$

$$\frac{2 \text{ mol R}}{2 \text{ mol R}}$$

% Yield Set-up

$$= \frac{.0349 \text{ mol Y}}{39.45 \text{ mol Y}} = .088\%$$

