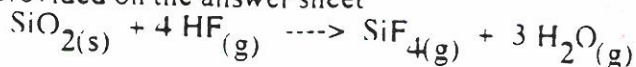


13. Use the following balanced chemical equation to answer the questions below. Show your work and answers in the space provided on the answer sheet



In the reaction, 6.0 g of silicon dioxide reacts with 400 mL of a 0.50 M solution of hydrogen fluoride.

$$6.0 \text{ g SiO}_2 \times \frac{1 \text{ mol}}{60.1 \text{ g SiO}_2} \times \frac{3 \text{ mol H}_2\text{O}}{1 \text{ mol SiO}_2} = 2.7 \text{ g H}_2\text{O}$$

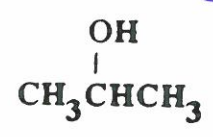
- a) What is the limiting reagent? (2)
 HF
 b) What is the amount of excess (in grams), of the other chemical? (1)
 $2.7 \text{ g H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g}} \times \frac{1 \text{ mol SiO}_2}{3 \text{ mol H}_2\text{O}} \times \frac{60.1 \text{ g SiO}_2}{1 \text{ mol SiO}_2} = 3.0 \text{ g Si}$
 $6.0 \text{ g} - 3.0 \text{ g} = 3.0 \text{ g Si in excess}$
 c) Based on the limiting reagent, how many grams of water would be produced? (2)

$$\frac{0.50 \text{ mol HF}}{1 \text{ L}} \times 0.400 \text{ L} = 0.200 \text{ mol HF} \times \frac{3 \text{ mol H}_2\text{O}}{4 \text{ mol HF}} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol}} = 2.7 \text{ g H}_2\text{O}$$

14. A colourless liquid used in rocket engines, whose empirical formula is NO_2 , has a molecular mass of 92.0 g. What is its molecular formula?

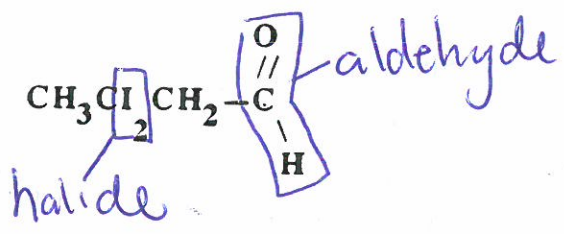
$$N = 14.0, O = 16.0, \frac{32.0}{46.0} \times \frac{92.0 \text{ g}}{46.0 \text{ g}} \times \text{NO}_2 = 2 \times \text{NO}_2 \Rightarrow \boxed{\text{N}_2\text{O}_4}$$

15. The correct name for the following compound is



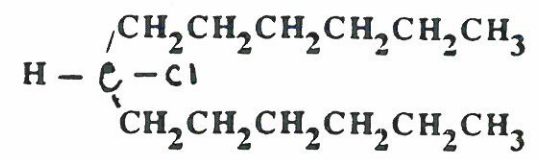
2-propanol

16. The ~~correct name for~~ functional groups of the following compound is



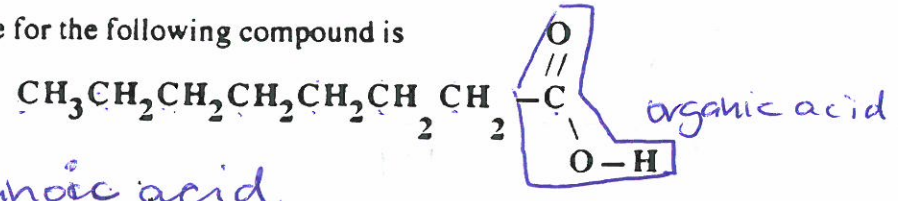
halide + aldehyde

17. The correct name for the following compound is



omit

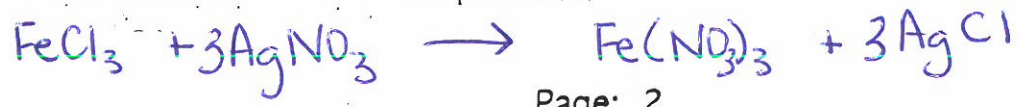
18. The correct name for the following compound is



octanoic acid

19. A solution of iron (III) chloride is mixed with a solution of silver nitrate.

Write a balanced equation. (2)

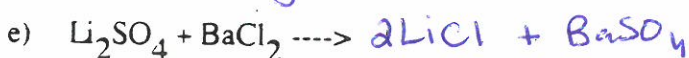
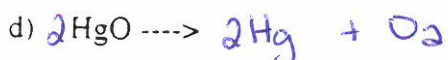
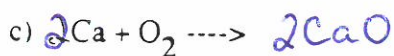


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21. Complete and balance the following equations:



22. The following data was collected when a 0.50 M solution of NaOH was titrated into 250.0 ml of an HCl solution until the phenolphthalein just turned pink.

Final buret reading.....25.8 ml

Initial buret reading.....7.2 ml

> 18.6 mL

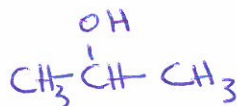
a) Write the balanced equation for the reaction? (1) $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

b) What is the [HCl]? (3)

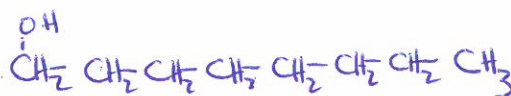
$$\frac{0.50 \text{ mol NaOH}}{1 \times} \times 0.0186 \text{ L} = 9.3 \times 10^{-3} \text{ mol NaOH} \times \frac{1 \text{ mol HCl}}{1 \text{ mol NaOH}} = \frac{9.3 \times 10^{-3} \text{ mol HCl}}{0.250 \text{ L}}$$

$$\Rightarrow 3.7 \times 10^{-2} \text{ M HCl}$$

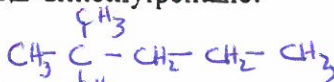
23. Draw the structural formula for 2-propanol.



24. Draw the structural formula for octanol.



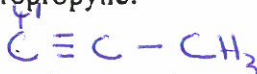
25. Draw the structural formula for 2,2-dimethylpentane.



26. Draw the structural formula for propene.



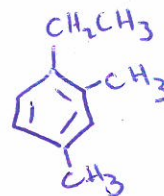
27. Draw the structural formula for 1-chloropropyne.



28. Draw the structural formula for propyl ethanoate



29. Draw the structural formula for 1-ethyl-2,4-dimethylbenzene.



30. Draw the structural formula for butyl methanoate.

