Unit 8: Chemical Reactions
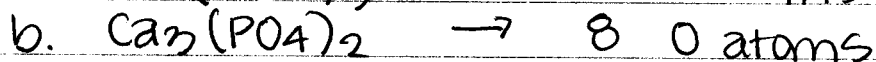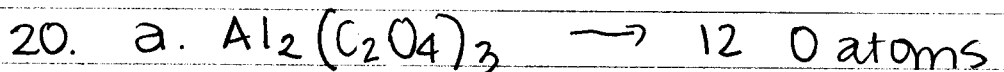
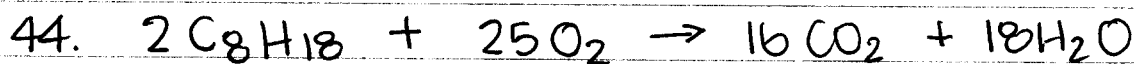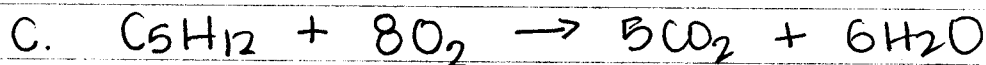Chem30A: End of chapter solutions not found in back of text.

Chapter 6:

20. a. $Al_2(C_2O_4)_3 \longrightarrow 12$ O atoms
    b. $Ca_3(PO_4)_2 \longrightarrow 8$ O atoms
    c. $Zn_3(PO_4)_2 \longrightarrow 8$ O atoms
    d. $Al_2(SO_4)_3 \longrightarrow 12$ O atoms

22. 12 N's ; 54 H's ; 6 P's ; 24 O's

24. Only one that is not balanced is
    b. $4NH_3 + 3O_2 \longrightarrow 6N_2 + 6H_2O$

26. a. $MnO_2 + 4HCl \longrightarrow MnCl_2 + Cl_2 + 2H_2O$

    b. $3Fe + 2O_2 \longrightarrow Fe_3O_4$

    c. $C_5H_{12} + 8O_2 \longrightarrow 5CO_2 + 6H_2O$

44. $2C_8H_{18} + 25O_2 \longrightarrow 16CO_2 + 18H_2O$
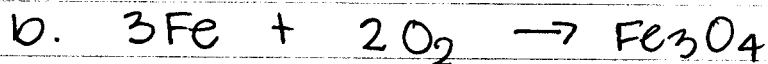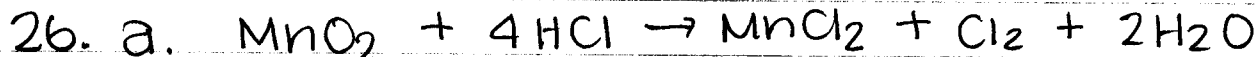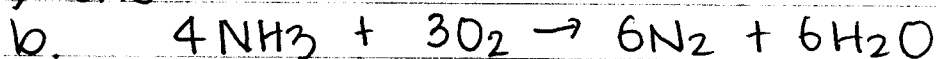
    a. $2.81 \text{ mol } C_8H_{18} \times \left(\dfrac{18\text{mol } H_2O}{2\text{mol } C_8H_{18}}\right) = 25.3 \text{ mol } H_2O$
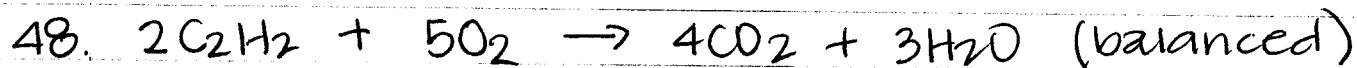
    from balanced equation

    b. $4.06 \text{ mol } O_2 \times \left(\dfrac{16\text{mol } CO_2}{25\text{mol } O_2}\right) = 2.60 \text{ mol } CO_2$

46. $\underline{C_7H_8 + 3HNO_3 \longrightarrow C_7H_5N_3O_6 + 3H_2O}$ (balanced)
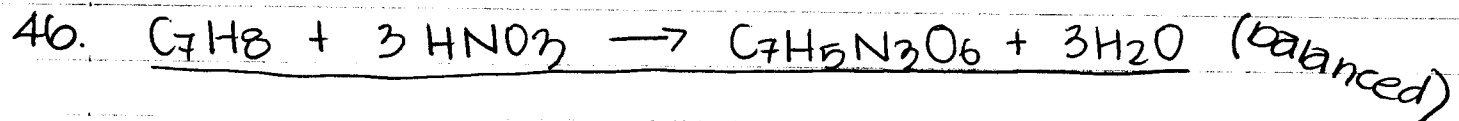
MW $\Rightarrow$ $C_7H_8 = 92.0 g/mol$; $C_7H_5N_3O_6 = 227 g/mol$

a. $454 g\ C_7H_8 \left(\dfrac{1 mol\ C_7H_8}{92g}\right)\left(\dfrac{3 mole\ HNO_3}{1 mol\ C_7H_8}\right)\left(\dfrac{63g}{1 mol\ HNO_3}\right) = 933g\ HNO_3$

b. $829 g\ C_7H_8 \left(\dfrac{1 mol\ C_7H_8}{92g}\right)\left(\dfrac{1 mol\ TNT}{1 mol\ C_7H_8}\right)\left(\dfrac{227g}{1 mol\ TNT}\right) = 2045 g\ TNT$

48. $2C_2H_2 + 5O_2 \longrightarrow 4CO_2 + 3H_2O$ (balanced)

MW of $C_2H_2 = 26.0 g/mol$

$52.0 g\ C_2H_2 \times \dfrac{1 mol\ C_2H_2}{26.0g} \times \dfrac{5 mol\ O_2}{2 mol\ C_2H_2} \times \dfrac{32.0g}{1 mol\ O_2}$

$= 160 g\ of\ O_2$

50. $NH_3 + 2O_2 \longrightarrow HNO_3 + H_2O$
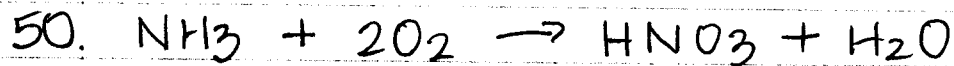
MW of $NH_3 = 17.0 g/mol$

MW of $HNO_3 = 63.0 g/mol$

$971 g\ NH_3 \times \dfrac{1 mol\ NH_3}{17.0 g\ NH_3} \times \dfrac{1 mol\ HNO_3}{1 mol\ NH_3} \times \dfrac{63.0g\ HNO_3}{1 mol\ HNO_3}$

$= 3598 g$

84. skip!