Chemical Reactions Regents Exam Problems Answer Key

#	Answer	Think
1	3	14.58 g $Mg_{(S)}$ + 5.60 g $N_{2(G)}$ → 20.18 g $Mg_3N_{2(S)}$ Law of conservation of matter math, mass of reactants = mass of products
2	3	Go slowly through the word equations while looking at table F (solubility guidelines for aqueous solutions). Silver Chloride is insoluble or SOLID in water. AgCl(S) not AQ!
3	3	This is single replacement. Here, the F replaces the Cl (an anion replacement)
4	2	Bonds form and energy is released. (memorize that line)
5	4	Equation must be balanced and the energy must be on the correct side of the equation, this is clearly exothermic, top line of table I.
6	3	Cr^{+3} and O^{-2} criss cross to make a neutral ionic compound.
7	4	Balanced equation works
8	2	24.51 g $KClO_3$ + energy → <u>X grams</u> KCl + 9.60 g O_2 Law of conservation of matter math, mass of reactants = mass of products
9	3	This is synthesis or they might trick you because it is also a combination reaction.
10	1	1 gram $H_{2(G)}$ + 15 grams $NO_{(G)}$ → <u>X grams</u> $N_{2(G)}$ + 9 grams $H_2O_{(G)}$ Law of conservation of matter math, mass of reactants = mass of products

11. $H_2B_4O_{7(S)}$ is the tetraboric acid formula. An empirical formula is a "ratio" of atoms:atoms represented in the most reduced form. This formula has a 2:4:7 ratio, and that cannot be reduced to a simpler ratio.

12. $P_4O_{10(S)} + 6H_2O_{(G)} \rightarrow 4H_3PO_{4(AQ)}$ + energy is balanced.
A number "1" is allowed too, like this: 1 $P_4O_{10(S)} + 6H_2O_{(G)} \rightarrow 4H_3PO_{4(AQ)}$ + energy

14. The solid reactant is the phosphorous decoxide, and its empirical formula would be: P_2O_5

15. The percent comp by mass of phosphorus in P_4O_{10} requires you to calculate the molar mass, then use it to calculate the percent comp. This sums to 100% (good). If you rounded your math to 44%, and 56%, an answer of 44% is also correct.

$\underline{P_4O_{10}}$	$\underline{P_4O_{10}}$
P 4 x 31 = 124 g	P (124/284) X 100% = 43.7%
O 10 x 16g = 160 g	O (160/284) X 100% = 56.3%
molar mass = 284 g/mole	sums up to 100%

16. Limestone is calcium carbonate, $CaCO_3$. A quick check on table F shows you that most carbonates are insoluble in water, with exceptions being ammonium and Group 1 metals. Calcium is in group 2, so $CaCO_3$ is insoluble in water.

17. In the reaction it is shown that heat is added to the one reactant (calcium carbonate), and when energy is a reactant, it is an endothermic reaction.