REMEMBERING TO BALANCE EQUATIONS

Remember the following:

- An equation is balanced when there are the same number of each type of atom on both sides of it.
- It can only be balanced by putting numbers in front of the chemical formulas you CANNOT change the chemical formula itself to make an equation balance.

How to balance an equation:

- a) Calculate how many atoms of each type are on each side of the equation.
- b) If the numbers are the same then the equation is balanced.
- c) If the numbers are not the same, then numbers are put in front of the formulas (this adds more of that substance). You cannot change the formulas (this would make a different substance). Hint start with unbalanced elements that only appear in one substance on each side of the equation.
- d) Keep doing this until the equation is balanced.

| e.g. Start: | CH₄ | + | $0_2 \rightarrow$ | CO ₂ + | H ₂ O | |
|-------------|--------|---|---------------------|-------------------|-------------------|--|
| | CH₄ | + | $O_2 \rightarrow$ | CO ₂ + | 2H ₂ O | Doubling the amount of water corrects the H's on both sides. |
| | CH_4 | + | $O_2 \rightarrow$ | CO ₂ + | 2H ₂ O | C, H are balanced bot O is not - but doubling on the LHS |
| Finish: | CH_4 | + | $2 O_2 \rightarrow$ | CO ₂ + | 2H ₂ O | corrects this. |

NB - None of the subcript numbers changed!

Questions

Put your final answers here although you may wish to do your working out with a pencil or on a separate sheet of paper or on the reverse of this sheet.

| 1) | $Ca + O_2 \rightarrow CaO$ |
|-----|--|
| 2) | $Na_2O + H_2O \rightarrow NaOH$ |
| 3) | $AI + O_2 \rightarrow AI_2O_3$ |
| 4) | Na + $Cl_2 \rightarrow NaCl$ |
| 5) | $Na_2CO_3 \rightarrow Na_2O + CO_2$ |
| 6) | $K + O_2 \rightarrow K_2O$ |
| 7) | C_4H_8 + $O_2 \rightarrow CO_2$ + H_2O |
| 8) | Fe_2O_3 + HCl \rightarrow $FeCl_3$ + H_2O |
| 9) | F_2 + KBr \rightarrow KF + Br ₂ |
| 10) | $C_5H_{12} \ \ \text{+} O_2 \ \ \rightarrow CO_2 \ \ \text{+} H_2O$ |
| 11) | NH_3 + $O_2 \rightarrow NO$ + H_2O |
| 12) | $HNO_3 \rightarrow NO_2 + H_2O + O_2$ |