Collated exam tips for Level 1: Chemical Reactions

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| ① Combination reactions **•** Combination reaction:two elements reacting together (joining/combining) to form a NEW substance  *metal + oxygen 🡪 metal oxide eg magnesium + oxygen gas 🡪 magnesium oxide* *metal + non-metal 🡪 compound eg iron + sulfur 🡪 iron sulfide* *gas + gas 🡪 new substance eg hydrogen gas + oxygen gas 🡪 water* Be sure to describe the formation of ions in detail, using a phrase such as "atoms achieve a STABLE,  FULL outer shell, by either losing or gaining electrons"To achieve with Merit you must explain the electron transfer involved in the formation of an ionic compound orthe sharing of electrons (lack of electron transfer) during the formation of a covalent compound.To achieve with Excellence you must state that "there is an electrostatic attraction between oppositely charged ions eg (the cation Fe2+) and (the anion S2-)Also…”don’t be daft”A combination reaction is the joining of different ELEMENTS, not substances or compoundsPlease don't use ANTHROPOMORPHIC language, atoms are never "happy" with full outer shells or "wishing" to give away electronsThe properties of an ionic compound are not, repeat NOT a mixture of the properties of the metal and non-metal from which it is madeThe symbol for a chlorine atom has a CAPITAL C and a lower case l, lower, lower case, little lPLUMBUM is the Latin word for lead, which has the symbol Pband Fe is the symbol for IRON from the Latin word FerrumDon't be daft, know your chemical symbols!Copper does not, never has and NEVER WILL rustNo sulfur is NOT a gas, sulfur is a yellow powderIf unsure about conditions for a reaction to occur, HEAT is usually a good betThe NEW substance formed will have DIFFERENT properties to the reactants used |

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| ② Decomposition reactions**•** 1 large compound 🡪 2 or 3 smaller compounds, one of which is usually a gas**•** Decomposition using strong heat aka thermal decomposition *eg metal hydrogen carbonate 🡪 metal carbonate + carbon dioxide + water* *eg metal carbonate 🡪 metal oxide + carbon dioxide* *eg metal hydroxide 🡪 metal oxide + water***•** Decomposition which occurs naturally but is sped up using a catalyst aka catalytic decomposition *eg hydrogen peroxide using a catalyst (manganese dioxide or potassium iodide or potato or liver)***•** Positive test for water: cobalt chloride paper turns from a blue to a pink colour**•** Positive test for carbon dioxide: bubble the gas into colourless limewater which turns a milky colour (be careful here to state both the initial and final colours of the limewater) or CO2 gas will extinguish a flameAlso…”don’t be daft”The symbol of oxygen is a CAPITAL O, this also applies for in nitrates NO3-, carbonates CO32- andsulfates SO42-Be careful, Na2CO3 (sodium carbonate) does NOT decompose thermallyA catalyst is a chemical that SPEEDS UP the rate of a reaction A catalyst is NOT USED UP during the reaction.Seeing BUBBLES is an observation, a gas forms is not.How would you see a colourless gas eg water vapour, usually by observing CONDENSATION on a tubeAn observation of “seeing steam” or “a colourless liquid” is NOT acceptable  |

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| ③ Precipitation/exchange reactions**•** Practise using and be able to interpret the solubility rules chart correctly You must link the colour change to the species involved Recognise colours from the NZQA Resouce sheet, learn the other colours not provided on that sheet. To achieve with Merit you must explain why a precipitate forms...eg "PbCl2 is a precipitate because according to the solubility rules chart, most chlorides are soluble except PbCl2 which is insoluble" To achieve with Excellenceyou should refer to the spectator ions in these precipitate reactionsAlso…”don’t be daft”Do not write ppt, it is meaningless, write PRECIPITATE, that is the solid substance which formsPrecipitates are not soluble, precipitates are **IN**SOLUBLEYou MUST refer to the solubility chart in your Resource bookThe symbol of oxygen is a CAPITAL O, this also applies in nitrates NO3-, in carbonates CO32- and sulfates SO42-Be careful, precipitates are NOT insoluble solutions, that is a contradiction! |

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| ④ Displacement reactions• A more reactive metal displaces another less reactive metal from a solution• Be sure to refer to the Activity Series provided to you in the Resource booklet• Link all colours to their species• Refer to both the initial and final colours• Double check that your equations are balancedTo achieve with Merit you must explain displacement reactions in terms of both atoms and ionsAlso…”don’t be daft”Remember that COLOURLESS solutions are just that! never clear!More reactive elements are higher on the Activity Series (or to the left) in your Resource bookletIron metal is made up of ATOMS with the symbol FeFe(II) or Fe(III) are IONS, Similarly copper METAL is Cu, Cu(II) is the symbol for copper ionsThe symbol for potassium is K, not P!!!! (K comes from the medieval Latin word Kalium)Don’t write an equal’s (=) sign, you MUST have an arrow 🡪  |

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