SOLUTIONS

1.

(a) $NiO_{(s)}$
(b) $PbF_{2(s)}$
(c) $Co(OH)_{2(s)}$
(d) $NH_4Cl_{(aq)}$
(e) $KNO_{3(aq)}$
(f) $AgI_{(s)}$
(g) $AuS_{(s)}$
(h) $SnSO_{4(aq)}$
(i) $FeCO_{3(s)}$
(j) $K_3PO_{4(aq)}$
(k) $NaNO_{3(aq)}$
(l) $MgBr_{2(aq)}$

2. Barium. (Example reason: Soluble as an oxide, insoluble as a sulphate.)

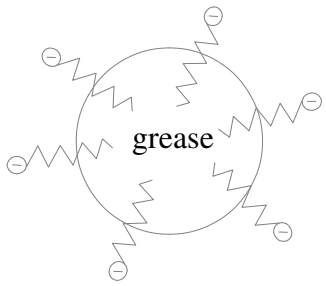
3. (only the ionic equation is written below, the steps to get there are not)
(a) $Cl_{2(g)} + Ca_{(s)} \rightarrow CaCl_{2(s)}$ ($CaCl_2$ is soluble but it's not in water here so it's solid)
(b) $PbCO_{3(s)} + 2H^+_{(aq)} + 2Cl^-_{(aq)} \rightarrow PbCl_{2(s)} + CO_{2(g)} + H_2O_{(l)}$
(c) $Mg(HCO_3)_{2(s)} + 2H^+_{(aq)} \rightarrow Mg^{2+}_{(aq)} + CO_{2(g)} + 2H_2O_{(l)}$
(d) No reaction (everything is aq on both sides)
(e) $H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$
(f) $2H^+_{(aq)} \rightarrow H_{2(g)}$
(g) $2Li_{(s)} + H_2O_{(l)} \rightarrow Li_2O_{(aq)} + H_{2(g)}$
(h) $C_3H_{8\,(g)} + 5O_{2\,(g)} \rightarrow 3CO_{2\,(g)} + 4H_2O_{(l)}$

4. Latent heat of fusion is absorbed/released during melting/freezing, whereas latent heat of vaporisation is absorbed/released during evaporation/condensation.

5. $\Delta H = mc\Delta T$

$$\therefore \Delta T = \frac{\Delta H}{mc_p} = \frac{600}{100 \times 4.18} = 1.4°C$$

6. Soaps and detergents have a long nonpolar chain and a polar end. The nonpolar end is attracted to grease, and the polar end to water. This way the grease can be cleaned off with the water.



The Ca^{2+} and Mg^{2+} ions in hard water form a precipitate with soap, so it can't clean properly. Detergents are not made insoluble by hard water, so they still work.

7. Clay particles have a negative surface charge, which means they are attracted to the strong positive charge of the aluminium ion. This forms clumps (floc) large enough to settle out.