Nan Chiau high chem p3 prelims 2011

A1a) Crystallisation b) Oxidation c) Polymerisation

A2a) C,D,E b) C c) A

A3a)(i) Li_2N (ii) Lithium nitrogen

A4a) There is an invisible layer of aluminium oxide that coats it, preventing it from exposure to the reagents.

b) Combustion of fuels release sulfur dioxide, which causes acid rain.

c) The copper sulfate solution will react with the galvanized iron container.

A5a)(i) Iron(II) oxide

(ii) limestone decomposes by heat to produce carbon dioxide and calcium oxide.

$CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

b) mol of CO = 21 divided by 28: 0.75 mol

mol of 3CO : mol of $2CO_2$

0.75: 0.75

Volume of CO_2 = 0.75 x 24 dm3: 18cm3

A6a) 2 and 3 b) 3 and 4 c) $CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

A7a) $NiS + 2O_2 \rightarrow NiO + SO_2$

b) Covalent bond, which has weak intermolecular forces between them that require little heat energy to break, resulting in the boiling point above.

c) Acid rain d) In hydrogenation

e) Aqueous zinc nitrate and copper (II) nitrate: no reactions

f) copper, nickel, zinc

A8a) lead iodide b) ammonia c) lead d)silver iodide

Section B

B9a) Heat sulphuric acid.

b)(i) 8 mins (ii) The reactants were used up. (iii) limestone (iv) (v) sulfuric acid is more reactive than hydrochloric acid.

B10a)(i) 65g (ii) 8 cm3

b)(i) Alkane (ii) C16H34 (iii) cracking (iv) hydrogenation (v) oxygen (vi)The bromine solution will change from reddish brown to colourless.

B11a) Change from gaseous to liquid state at r.t.p, become darker in colour. Astatine is solid and black in colour.

c) The iodide will be displaced from sodium as chlorine is a more reactive halogen. $Cl_2 + NaI \rightarrow NaCl + I$