END OF YEAR MOCK EXAMINATION
SECONDARY THREE
IP CHEMISTRY (ANSWER KEY)

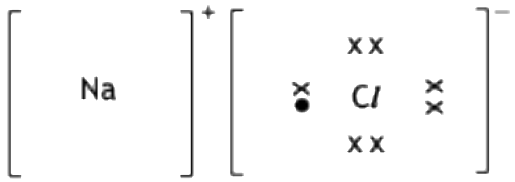
Paper 1

1	A	B	C	**D**
2	**A**	B	C	D
3	A	B	**C**	D
4	A	**B**	C	D
5	A	B	C	**D**
6	A	B	**C**	D
7	A	B	**C**	D
8	A	**B**	C	D
9	A	B	**C**	D
10	A	**B**	C	D
11	A	**B**	C	D
12	A	B	**C**	D
13	A	**B**	C	D
14	A	B	**C**	D
15	**A**	B	C	D
16	A	**B**	C	D
17	**A**	B	C	D
18	A	B	C	**D**
19	A	B	**C**	D
20	A	B	C	**D**

Paper 2

Question 1

(a)(i)



(a)(ii) NaC*l* exists as a giant ionic lattice with strong electrostatic forces between Na^+ and Cl^- ions while Cl_2 has a simple molecular structure, where there are weak intermolecular forces of attraction between Cl_2 molecules. [1]

More energy is required to overcome the strong ionic bonds in sodium chloride than the weak intermolecular forces of attraction between Cl_2 molecules. [1]

(b) Ionic compounds conduct electricity in aqueous state, whereas covalent compounds do not. A circuit is set up using 2 carbon electrodes / electrical wires dipped in the respective solutions. The electrodes are then connected to a battery and a light bulb/ammeter. [1]

In an ionic compound, the free-moving ions act as mobile charge carriers, and the bulb will light up. [1]

In a covalent compound, there are no free-moving electrons or ions to act as mobile charge carriers to help conduct electricity and the bulb will not light up. [1]

Question 2

(a) A: Fe/ iron

B: $Fe(NO_3)_2$ / iron(II) nitrate

C: Cu / copper

D: $Fe(OH)_2$ / iron(II) hydroxide

(b) $Fe(s) + 2H^+(aq) \rightarrow Fe^{2+}(aq) + H_2(g)$

Question 3

(a) 11.8 %

(b)(i) $NH_3(aq/g) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$

(b)(ii) It conducts electricity as it contains free-moving NH_4^+ and OH^- ions, that act as mobile charge carriers.

(c) 21.2 %

(d)(i) CO_3^{2-}

(d)(ii) The reaction of aqueous barium chloride forms either barium sulfate or barium carbonate precipitate [1]. Since the precipitate dissolves after the addition of dilute nitric acid, it shows that the precipitate is barium carbonate; and hence the contaminant contains carbonate ions [1].

Question 4

(a)(i) A strong acid is one that ionises completely in water to form (a high concentration of) H+ ions.

(a)(ii) The acid strength of HX increases down Group 17.

(a)(iii) The bond energy of H−X decreases down Group 17.

(a)(iv) The higher the bond energy H−X, the weaker the acid is. [1] A larger H−X bond energy of H−X means larger amount of energy required to break all the H–X bonds in one mole of HX molecules. [1] Hence, acid dissociates to a smaller extent. [1]

(b) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$

(c)(i) $HF(aq) \rightleftharpoons H^+(aq) + F^-(aq)$

(c)(ii) Yes, a concentrated weak acid can have the same concentration of H^+ ions as a dilute strong acid.