

Bonding – A2 Chemistry P1 & P3

1. No.5

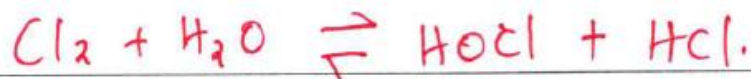
0 5

This question is about chlorine.

0 5 . 1

Give an equation to show how chlorine forms an acidic solution in water.

[1 mark]



0 5 . 2

Give an equation for the reaction between chlorine and cold, dilute aqueous sodium hydroxide.

[1 mark]



0 5 . 3

In acidic conditions, ClO_3^- ions oxidise Cl^- ions to form Cl_2 Deduce a half-equation for the oxidation of Cl^- to Cl_2 Deduce a half-equation for the reduction of ClO_3^- to Cl_2

Deduce the overall equation for this reaction.

[3 marks]

Half-equation for the oxidation of Cl^- to Cl_2 Half-equation for the reduction of ClO_3^- to Cl_2 

Overall equation

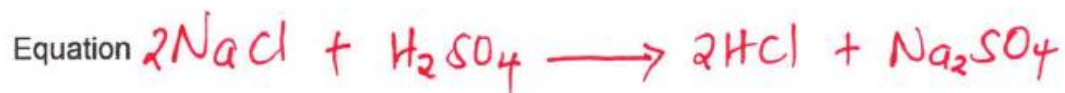


0 5 . 4

Give the equation for the reaction of solid sodium chloride with concentrated sulfuric acid.

State the role of the chloride ions in this reaction.

[2 marks]

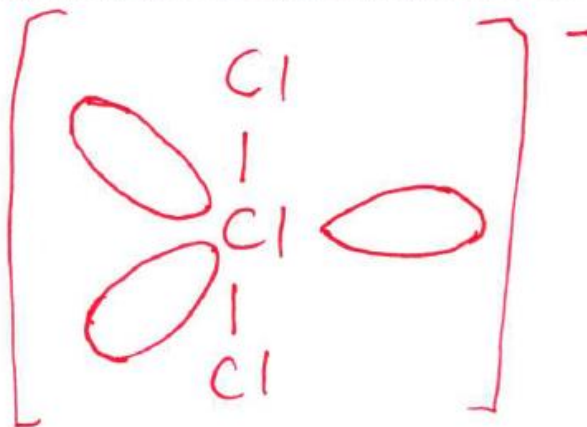


Role Proton acceptor.

0 5 . 5

Draw the shape of the Cl_3^- ion.
Include any lone pairs of electrons that influence the shape.

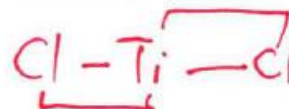
[1 mark]



0 5 . 6

Chlorine forms an ion with the Group 3 element thallium (Tl).

State and explain the bond angle in TlCl_2^+



[2 marks]

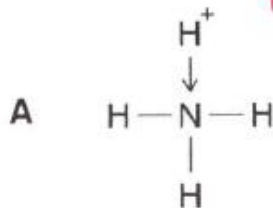
Bond angle 180°

Explanation The 2 bond pairs repel as far apart as possible

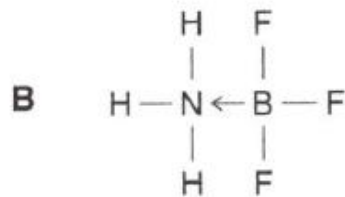
2. No.10

Which diagram shows the formation of a dative covalent bond?

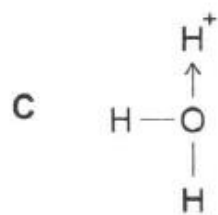
[1 mark]



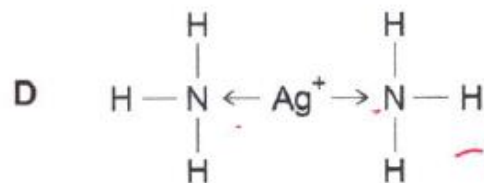
H^+ is an empty atom with no electron, so it cannot donate lone pairs of electrons to Nitrogen.



B is electron deficient. So it has no enough electrons / lone pairs to donate to Nitrogen.



H^+ is electron deficient. O has lone pairs of electrons that it donates to to form coordinate covalent bond.



- does not yield a dative covalent bond.



3. No.11

Which substance does **not** have any bond angles of 120° ?

[1 mark]

A benzene

☐ Trigonal planar 120°

B boron trifluoride

☐ Trigonal planar 120°

C cyclohexane

☒ Chair conformation 109.5°

D graphite

☐ Trigonal planar 120°

4. No.12

Which molecule does **not** have a permanent dipole?

[1 mark]

A NH_3 ☐ N-H polar has permanent dipole.B PCl_3 ☐ P-Cl polar bonds $\text{N} \text{ } \text{N} \text{ } \text{N}$ C SCl_2 ☐ S-Cl polar has permanent dipole.D SiCl_4 ☒ 4 Si-Cl are identical therefore non symmetrical. No dipole.