

Halogens

Question Paper

Level	Pre U
Subject	Chemistry
Exam Board	Cambridge International Examinations
Topic	Halogens- Main group chemistry
Booklet	Question Paper

Time Allowed: 13 minutes

Score: /11

Percentage: /100

Grade Boundaries:

1. Nitrogen forms a variety of oxides and halides.

- (a) Nitrogen triiodide, NI_3 , is an explosive that detonates with a snap even when only touched lightly. Given that the electronegativity value for nitrogen is 3.07 and for iodine is 2.36, indicate below the dipole in an N–I bond.



[1]

- (b) (i) Nitrogen trifluoride, NF_3 , can be prepared by reacting ammonia with fluorine. In this reaction the fluorine oxidises the nitrogen in ammonia while the oxidation number of hydrogen is unchanged.

Give the equation for this reaction.

..... [1]

- (ii) Nitrogen trifluoride is used to etch silicon in microelectronics. It is decomposed to its elements and the fluorine is used to attack the silicon.

Give the equation for the decomposition of nitrogen trifluoride.

..... [1]

- (iii) Nitrogen trifluoride is a molecule that has attracted controversy recently for its possible potent contribution to the greenhouse effect. Draw the dot-cross diagram of this molecule; only include outer electrons. State the shape and the bond angle.

shape

bond angle [3]

- (iv) Whereas nitrogen trifluoride is reasonably easy to handle, nitrogen trichloride is an extremely dangerous explosive. Suggest why nitrogen trifluoride is more stable than the other nitrogen trihalides.

.....
..... [1]

(c) N_2O_5 is a less well-known oxide of nitrogen.

(i) N_2O_5 is the anhydride of nitric acid, which means that it reacts with water to produce the acid. Write an equation for N_2O_5 reacting with water.

..... [1]

(ii) N_2O_5 can be made by reacting nitric acid with a dehydrating agent such as phosphorus(V) oxide. Bearing in mind that phosphorus(V) oxide is the anhydride of phosphoric acid, H_3PO_4 , write an equation for the reaction between nitric acid and phosphorus(V) oxide.

..... [2]

(iii) In the solid state N_2O_5 is an ionic compound. Given that N_2O_5 is sometimes known as 'nitronium nitrate' write the ionic formula representation of N_2O_5 .

..... [1]

[Total: 11]