

A level Chemistry A

H432/01 Periodic table, elements and physical chemistry

Question Set 1

1 (a) This question is about ions and compounds containing hydrogen.

Lithium aluminium hydride, LiAlH_4 , contains the AlH_4^- ion

Draw a 'dot-and-cross' diagram to show the bonding in an AlH_4^- ion. Show outer electrons only

[1]

(b) Nitrogen forms NH_4^+ and NH_2^- ions.

Predict the name of the shape of, and H–N–H bond angle in, NH_4^+ and NH_2^- .

Ion	Name of shape	H–N–H bond angle
NH_4^+
NH_2^-

[2]

(c) (i) Nitrogen, phosphorus and arsenic are in Group 15 (5) of the periodic table. The boiling points of their hydrides are shown below.

Element	Hydride	Boiling point/°C
N	NH_3	–33
P	PH_3	–88
As	AsH_3	–55

Explain why the boiling point of PH_3 is lower than the boiling point of NH_3 .

[2]

(ii) Explain why the boiling point of PH_3 is lower than the boiling point of AsH_3 .

[2]

Total Marks for Question Set 1: 7

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