

1.3 – STRUCTURE & BONDING – PPQ6



Name Form

6) a) Ammonia, NH_3 , reacts with sodium to form sodium amide, NaNH_2 , and hydrogen.

i) Write an equation for the reaction between ammonia and sodium.

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ii) Draw the shape of an ammonia molecule and that of an amide ion, NH_2^- . In each case show any lone pairs of electrons.



iii) State the bond angle found in an ammonia molecule.

iv) Explain why the bond angle in an amide ion is smaller than that in an ammonia molecule.

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(6)

b) The equation shows the reaction between boron trifluoride and a fluoride ion. $\text{BF}_3 + \text{F}^- \rightarrow \text{BF}_4^-$

i) Draw diagrams to show the shape of the BF_3 molecule and the shape of the BF_4^- ion. In each case, name the shape. Account for the shape of the BF_4^- ion and state the bond angle present.

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ii) In terms of the electrons involved, explain how the bond between the BF_3 molecule and the F^- ion is formed. Name the type of bond formed in this reaction.

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(9)