Principles of organic synthesis worksheet

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For each reaction in questions 1–3, add curly arrows to show the movement of electron pairs to produce the products shown. In question 3 add the other product of the reaction into the box.

**4)** Ammonia is able to act as a nucleophile. When it reacts with a H+ ion it forms an ammonium ion.

(a) Draw the shape of ammonia and of the ammonium ion. Indicate the bond angle(s)

|  |  |  |
| --- | --- | --- |
|  | **Ammonia** | **Ammonium ion** |
| Shape |  |  |
| Bond angle(s) |  |  |

*(4 marks)*

(b) State how ammonia is able to act as a nucleophile

*(2 marks)*

(c) Outline the mechanism by which ammonia reacts with a H+ ion to form the ammonium ion

 *(2 marks)*

For questions 5-8 draw the structures of the products formed in the boxes.

