**Hydrogen Bonding Questions**

**Due in: Wednesday 23rd November 2016**

1. (a)Name the strongest type of intermolecular force between water molecules and draw a diagram to illustrate how two molecules of H2O are attracted to each other.  
   In your diagram show all lone pairs of electrons and any partial charges. Explain the origin of these charges.  
   Suggest why this strong intermolecular force is not present between H2S molecules.

(7)

1. The table below shows the electronegativity values of some elements.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Fluorine | Chlorine | Bromine | Iodine | Carbon | Hydrogen |
| Electronegativity | 4.0 | 3.0 | 2.8 | 2.5 | 2.5 | 2.1 |

(a) Define the term *electronegativity*.

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(2)

(b) The table below shows the boiling points of fluorine, fluoromethane (CH3F ) and hydrogen fluoride.

|  |  |  |  |
| --- | --- | --- | --- |
|  | F–F |  | H–F |
| Boiling point/K | 85 | 194 | 293 |

(i) Name the strongest type of intermolecular force present in:

Liquid F2 .........................................................................................................

Liquid CH3F ...................................................................................................

Liquid HF .......................................................................................................

(ii) Explain how the strongest type of intermolecular force in liquid HF arises.

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(6)

(c) The table below shows the boiling points of some other hydrogen halides.

|  |  |  |  |
| --- | --- | --- | --- |
|  | HCl | HBr | HI |
| Boiling point / K | 188 | 206 | 238 |

(i) Explain the trend in the boiling points of the hydrogen halides from HCl to HI.

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(ii) Give **one** reason why the boiling point of HF is higher than that of all the other hydrogen halides.

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(3)

(Total 18 marks)