

## Covalent bonding and simple molecules

A1. (2018)

01.2 | a molecule

1

AO1  
5.2.1.4

A2. (2018)

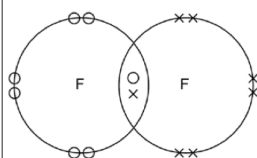
01.5 | 1

1

AO1  
5.2.3.2

A3. (2018)

02.2



one shared pair anywhere in overlap between two circles **or** on intersection

1

AO2  
5.1.2.6  
5.2.1.4

6 other electrons on each atom

1

allow dots **or** crosses **or** mixture for all marks

ignore any inner shell electrons

A4. (2019)

05.4

one shared pair in each overlap

4 non-bonding electrons in outer shell of oxygen

allow combination of circles, dots, crosses or  $e^{-}$

do **not** accept extra electron(s) on outer shell of hydrogen

ignore any inner shell electrons

1

1

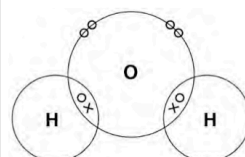
AO1  
5.2.1.4

diagram scores 2 marks

A5. (2019)

05.5 | covalent

1

AO1  
5.2.2.1  
5.2.2.4

A6. (2019)

|      |                                             |  |   |                |
|------|---------------------------------------------|--|---|----------------|
| 05.6 | higher (than)                               |  | 1 | AO2<br>5.2.2.4 |
|      | stronger<br>(than between oxygen molecules) |  | 1 |                |

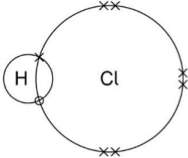
## A7. (2020)

|      |                                  |                               |   |                |
|------|----------------------------------|-------------------------------|---|----------------|
| 07.1 | any <b>one</b> from:             |                               | 1 | AO2<br>5.2.1.4 |
|      | • not to scale                   | allow size of atoms incorrect |   |                |
|      | • not 3 dimensional / D          | allow atoms are separated     |   |                |
|      | • incorrect arrangement in space | ignore properties of water    |   |                |
|      | • electrons / shells not shown   |                               |   |                |

## A8. (2020)

|      |                   |                          |   |                |
|------|-------------------|--------------------------|---|----------------|
| 07.3 | CH <sub>4</sub> O | allow CH <sub>3</sub> OH | 1 | AO2<br>5.2.1.4 |
|------|-------------------|--------------------------|---|----------------|

## A9. (2022)

|      |                                                    |                                                                                     |   |                           |
|------|----------------------------------------------------|-------------------------------------------------------------------------------------|---|---------------------------|
| 02.1 |                                                    | allow any combination of circles, dots, crosses or e <sup>(-)</sup>                 |   | AO1<br>5.1.2.6<br>5.2.1.4 |
|      | one shared pair in overlap                         |                                                                                     | 1 |                           |
|      | 6 non-bonding electrons in outer shell of chlorine | do <b>not</b> accept extra electron(s) on outer shell of hydrogen                   | 1 |                           |
|      |                                                    | ignore any inner shell electrons                                                    |   |                           |
|      |                                                    | an answer of                                                                        |   |                           |
|      |                                                    |  |   |                           |
|      |                                                    | scores <b>2</b> marks                                                               |   |                           |

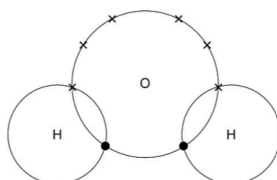
## A10. (2023)

03.4

one shared pair in each overlap

four non-bonding electrons in  
outer shell of oxygenallow any combination of circles,  
dots, crosses,  $e^-$  for electronsdo **not** accept extra electron(s)  
on outer shell of hydrogen

ignore any inner shell electrons

the diagram below scores 2  
marks

1

1

AO1  
5.2.1.1  
5.2.1.4

02.1

one pair of electrons drawn in  
each of the three overlaps

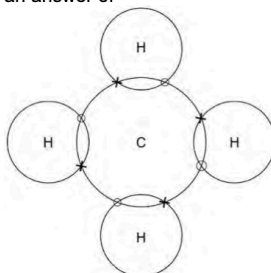
allow any combination of circles,  
dots, crosses,  $e^-$  for electrons

ignore inner shell electrons on  
the carbon atom

do **not** accept extra electron(s)  
on outer shell of carbon /  
hydrogen

allow **1** mark for one shared pair  
in one overlap without non-  
bonding electron(s) on that  
hydrogen

an answer of



scores **2** marks

2

AO1  
5.2.1.1  
5.2.1.4