**2002 HIGHER SCHOOL CERTIFICATE EXAMINATION**

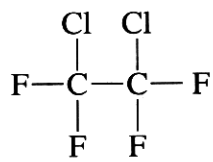
# Chemistry

**Section I – Part B (continued)**

**Marks**

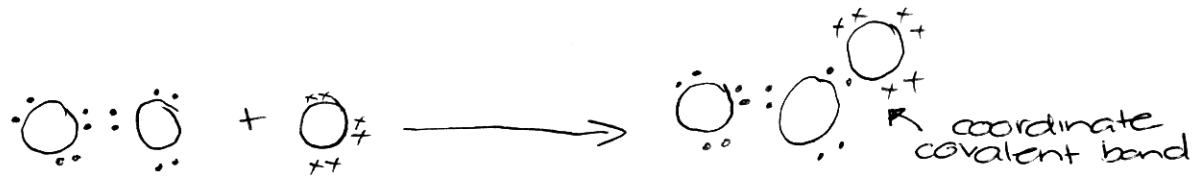
**Question 25** (6 marks)

(a) What is the systematic name of the CFC in the diagram? **1**



1,2-dichloro-1,1,2,2-tetrafluoroethane

(b) Identify the bonding within ozone, using a Lewis electron-dot diagram. **2**




$O_2 + O \longrightarrow O_3$ ozone

(c) Discuss how CFCs damage the ozone layer, using relevant equations. **3**

CFCs are very inert gases. Also they are insoluble in water and so cannot be removed from troposphere by rain. As a result they move up to the stratosphere. At the stratosphere they are exposed to UV radiation, which is able to break the C-Cl bonds, forming Cl free radicals: $CCl_3F \xrightarrow{UV\ radiation} CCl_2F + Cl$. This Cl radical reacts with $O_3$ in the stratosphere, decomposing it:

$$Cl + O_3 \longrightarrow ClO + O_2$$

Furthermore, due to the presence of O radicals in the stratosphere, as a result of continous formation & decomposition of ozone, the ClO is able to react with it:

$$ClO + O \longrightarrow O_2 + Cl$$

Here the Cl radical is regenerated and consequently is able to cause further destruction to the ozone layer.