# AS Level Chemistry B

**H033/02** Chemistry in depth

## Question Set 12

**12** Halons are halogenated organic compounds.

Halons have been particularly useful in aircraft fire extinguishers.

One halon is Halon–1211, $CBrCl F_2$.

In the high temperature of a fire one of the bonds in $CBrCl F_2$ breaks and radicals are formed.

**(a)** A student states that it is a C–F bond that breaks because C–F is the most polar of the threecarbon-halogen bonds.

The student's statement is partially correct.

**(i)** Explain, chemically, the correct part of the statement. **[2]**

**(ii)** Correct the incorrect part of the statement, giving a reason for the correction. **[2]**

**(b)** An alternative halon that is also used in fire extinguishers has the following composition bymass.

| C | Br | F |
|---|---|---|
| 9.2% | 61.5% | 29.3% |

The $M_r$ of this halon is 259.8.

Deduce the molecular formula of this halon.

molecular formula of halon = ..... **[2]**

**(c)** When halons get into the stratosphere, C–C$l$ bonds can be broken by UV radiation from theSun.

The minimum frequency of radiation needed to break one C–C$l$ bond is $8.67 \times 10^{14}$ Hz.

Calculate the bond enthalpy of the C–C$l$ bond, in kJ mol$^{-1}$.

bond enthalpy = ..... kJ mol$^{-1}$ **[3]**

**(d)** Ozone and nitrogen dioxide are present in both the troposphere and the stratosphere.

Describe the advantages and disadvantages of the presence of ozone and how it can be affected by the presence of nitrogen dioxide in the troposphere and stratosphere.

Give equations where appropriate. **[6]**

## Total Marks for Question Set 12: 15