

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

Alkenes react with bromine (Br_2)

- (a) Name and outline the mechanism for the reaction of cyclohexene with Br_2

Name of mechanism _____

Outline of mechanism



(5)

- (b) Explain why there is an attraction between a $\text{C}=\text{C}$ double bond and Br_2

(3)

- (c) Draw the skeletal formula of the halogenoalkane formed when buta-1,3-diene ($\text{CH}_2=\text{CHCH}=\text{CH}_2$) reacts with an excess of Br_2

(1)

(Total 9 marks)

Q2.

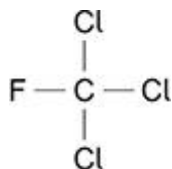
CFCs were used as refrigerants and in aerosols.

The scientists Rowland and Molina published research in 1974 to show that CFCs are responsible for the destruction of ozone molecules in the upper atmosphere.

A few years later, other scientists discovered that the concentration of ozone in the upper atmosphere was decreasing.

In 1987 there was an agreement by many countries to restrict the use of CFCs.

- (a) The molecule CFC-11 was commonly used as a refrigerant.



Use IUPAC rules to name CFC-11

(1)

- (b) A molecule of CFC-11 breaks down in the upper atmosphere to form a chlorine free radical.
Give the equation for this reaction.

(1)

- (c) A typical refrigerator contained 0.50 kg of CFC-11 ($M_r = 137.5$).

One molecule of CFC-11 causes the destruction of approximately 100 000 molecules of ozone.

Use these data to estimate the number of molecules of ozone that can be destroyed by 0.50 kg of CFC-11

Give your answer in standard form.

The Avogadro constant, $L = 6.022 \times 10^{23} \text{ mol}^{-1}$

Number of molecules of ozone _____

(2)

- (d) State the benefit to life on Earth of ozone in the upper atmosphere.

(1)

- (e) Suggest **one** reason why the use of CFCs was not restricted until several years after Rowland and Molina published their research.

(1)

- (f) CFC-11 is a greenhouse gas that can contribute to global warming.
State and explain how CFC-11 is able to contribute to global warming.

(2)

(Total 8 marks)