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Answers

Practice exam questions

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Check your answers to the questions in this issue.

A new wave of chemistry: how geochemistry can predict tsunamis (pp. 23–25)

1 Mean titre volume of EDTA = $\frac{19.14 + 19.17 + 19.13}{3}$ = 19.15 cm^3 = 0.01915 dm^3

0.01915 dm^3 of 0.01 mol dm^{-3} EDTA contains 0.0001915 mol of EDTA

1 mole of EDTA reacts with 1 mole of Ca^{2+}, therefore 25.00 cm^3 of the test solution contains 0.0001915 mol of Ca^{2+}

25.00 cm^3 = 0.02500 dm^3

Concentration of Ca^{2+} in the sample = $\frac{0.0001915\ \text{mol}}{0.02500\ \text{dm}^3}$ = 0.00766 mol dm^{-3}

CFCs, HFCs and the ozone layer (pp. 26–31)

1 **a** **i** CFC-13

ii HCFC-225 (HCFC-225ca)

b **i** $CHCl_2F$

ii $C_2HCl_2F_3$ (actually $CHCl_2CF_3$)

2 **a** **i** $^{12}C^{37}ClF_3^+$ (or $^{14}C^{35}ClF_3^+$)

ii $^{12}C^{35}ClF_2^+$

iii $^{12}CF_3^+$

iv $^{12}CF_2^+$

b The C–Cl bond energy is smaller than the C–F bond energy, which means that the C–Cl bond preferentially breaks. This leads to the CF_3^+ ion being more abundant, rather than $CClF_2^+$.

3 All the fluorine atoms in $Cl_3C.CF_3$ are in the same electronic environment, whereas those in $ClF_2C.CCl_2F$ experience two different environments (being attached to different carbons with differing numbers of chlorines and fluorines). Therefore $Cl_3C.CF_3$ will give a simpler spectrum (than $ClF_2C.CCl_2F$), with just one signal.