Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

any two: skin cancer; cataracts / eye damage; sunburn; weaker immune system

2.2

CFCs rise slowly into the stratosphere, where UV breaks them up and releases chlorine atoms; a chlorine atom reacts with ozone, forming oxygen; the chlorine is freed again, so one atom can destroy thousands of ozone molecules (catalyst)

3.1

(a) ozone fell sharply from about 300 DU in 1970 to about 130 DU in the 1990s; since about 2000 it has stopped falling and is rising slowly

(b) the very cold winter forms polar stratospheric clouds, where chlorine is changed into active forms; when sunlight returns in spring, it releases chlorine atoms that destroy ozone quickly

3.2

(a) any two: replacement chemicals were available at low cost; only a few firms made CFCs; clear scientific evidence and visible ozone hole; a fund helped poorer countries switch; trade limits with non-members

(b) CFCs stay in the atmosphere for decades to a century; CFCs are still released from old fridges, foams and landfills; some illegal production continues, and chlorine keeps destroying ozone as a catalyst until it is removed

3.3

award up to [5]: similarities: a global problem needing every country; strong science; help for poorer countries can work; differences: ODS came from a few products with cheap substitutes, but CO_2 comes from almost all energy use, transport, farming and industry; cutting CO_2 costs more and affects whole economies and jobs; Montreal had binding phase-out dates and trade limits; Paris targets are voluntary; conclusion: lessons on funding and review apply, but climate is much harder, with justification

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