Exercise 1

In this exercise, you will read a passage and then answer the questions that follow. The suggested time for reading the passage and answering the questions is 15 minutes.

Will Antarctic Ozone Bite the Dust?

This year's ozone hole above Antarctica may be deeper than ever as a result of the eruption of Mount Pinatubo. This is the conclusion of researchers who have combined observations of the effect of debris from the eruption on the stratosphere with the latest measurements of stratospheric ozone over the equator and the Antarctic.

A team led by W. B. Grant of the NASA Langley Research Center in Hampton, Virginia, monitored the influence of Mount Pinatubo, in the Philippines, before and after its eruption last June, using balloon-borne instruments launched from Brazzaville in the Congo (4 South, 15 East) and Ascension Island (8 South, 14 West).

The scientists found that most of the volcanic material injected into the stratosphere settles out at a height of between 18 and 28 kilometres, with the greatest concentrations between 24 and 25 kilometres. At precisely these altitudes, the amount of ozone in the stratosphere declined between three and six months after the eruption. The greatest loss — of 20 per cent — was at an altitude of 24 kilometres (*Geophysical Research Letters*, Vol. 19, p.1109).

The loss of ozone at a height of between 16 and 28 kilometres was between 13 and 20 Dobson units — about 5 per cent. There was a slight increase in the ozone concentration above 28 kilometres, but the researchers could not measure ozone beyond 31 kilometres because their balloons burst.

Grant and his team suggest that reactions in the stratosphere involving the Pinatubo material release chlorine in the active form which destroys ozone. Stratospheric chlorine originates chiefly from the manufactured compounds known as CFCs, but is usually locked up in stable form as chlorine nitrate. In the presence of sulphuric acid droplets from Mount Pinatubo, ozone-destroying chlorine monoxide is released.

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Chlorine monoxide, which is produced by a similar series of reactions involving icy particles in the stratosphere, is blamed for the springtime depletion of ozone above Antarctica. In 1991, this depletion was as severe as in any year since the discovery of the ozone hole in the early 1980s, according to B. L. Johnson, T. Deshler and R. A. Thompson of the University of Wyoming, Laramie. Balloon flights from McMurdo Station, which lies at 78 South, revealed severe ozone depletion in October 1991 at altitudes between 12 and 20 kilometres, with a 93 per cent loss of ozone between 17 and 18 kilometres (*Geophysical Research Letters*, Vol. 19, p. 1105).

The minimum amount of ozone above McMurdo, reached on 10 October 1991, was 146 Dobson units — almost exactly the same as the minimum reached in 1987 and 1990. The figure for the column between 12 and 20 kilometres altitude was a record low of 18 Dobson units, representing a loss of 83 per cent of the ozone in that layer.

"The 1991 volcanic eruptions will substantially increase the aerosol loading within the polar vortex for 1992, both below and above 20 kilometres," the team predicts. "These extra particles may enhance the heterogeneous reactions, leading to ozone destruction, and this ozone depletion above Antarctica may worsen in 1992 by spreading to altitudes beyond the 12 to 20 kilometres layer."

Questions 1-4

The table below gives information about ozone depletion. Give the missing information.

Year	1987	1991
Altitude	1.	2.
Percentage of loss	3.	4.

Questions 5-8

By referring to the passage, decide whether the following statements are true or false. Write T for true and F for false.

_____ 5. Ozone is destroyed by chlorine in the active form.

_____ 6. Chlorine nitrate was responsible for the springtime depletion of ozone above Antarctica.

_____ 7. The aerosol loading within the polar vortex will increase substantially because of the 1991 volcanic eruptions.

_____ 8. Scientists predict that ozone depletion over Antarctica may improve in 1992.

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