

**Marks**  
**8**

- One of the causes of acid rain is a reaction occurring in the upper atmosphere between gaseous  $\text{NO}_2$  and water to produce nitric acid and gaseous  $\text{NO}$ . Write a balanced chemical equation for this reaction.

As part of their school project on acid rain, some high school students collected a sample of rain (220 mL) and measured the pH value of the solution, reporting the value as  $\text{pH} = 3.9$ . Assuming that the rain sample does not contain any acids other than nitric acid, calculate the volume of gaseous  $\text{NO}_2$  that would have been consumed in the upper atmosphere (where temperature =  $-56^\circ\text{C}$  and pressure = 11.6 kPa) to produce the sample of rain collected by the students.

ANSWER: