CH3041 Tutorial 1 Air Chemistry

Name:

Nitrogen is a major gas in the troposphere. Calculate the partial pressure (torr) of nitrogen 3.00 km above sea level given that nitrogen comprises 78.084% by volume of the permanent gases in the troposphere. You will need to use the barometric law and assume ideal gas behaviour and standard temperature (0.00°C). Atmospheric pressure at sea level is 760 torr and the scale height is 8.40 km.

- 2. Describe the **Chapman mechanism** for the formation of **ozone** in the stratosphere.
 - Draw Lewis dot and VSEPR structures for ozone.
 - Why is the presence of ozone in the stratosphere regarded as essential for the success of most life-forms on the planet and yet it is harmful to many of the some life-forms in the lower troposphere?

3. In pollution monitoring aerosol particles are routinely monitored as well as toxic gases.

- Provide three examples of common aerosols and describe how these particles originate.
- Why are aerosol particles often regarded as a health problem?

- 4. In a pollution monitoring exercise a 1.00 m³ sample of air was found to contain 80 μ g/m³ of SO₂. The temperature and pressure were 25.0°C and 103.193 kPa when the air sample was taken.
 - What was the SO₂ concentration in ppm?
 N.B. Assume ideal gas behaviour for the gas 1mol = 22.414 dm³ at 273K and 101.325 kPa, you will need to correct for the temperature & pressure.