Chapter G

Gases and Thermal Physics

$^{7}/_{8}$

G1 Kelvin Scale of Temperature

Convert the following temperatures into the 'other' unit. Remember that $0\ ^\circ$C = 273 K (no $^\circ$ in K).

G1.1 $23\ ^\circ$C

G1.2 90 K

G1.3 4 K

G1.4 300 K

G1.5 $600\ ^\circ$C

G1.6 $-90\ ^\circ$C

G1.7 $37\ ^\circ$C

G1.8 $1.5 \times 10^7\ ^\circ$C

$^{8}/_{10}$

G2 Gas Laws

Don't forget that one mole of gas contains 6.02×10^{23} molecules, and that the mass of this number of molecules is called the 'molar mass'. Take the gases to be ideal.

G2.1 What is the volume of a mole of gas at atmospheric pressure (1.01×10^5 Pa) and at $20\ ^\circ$C?

G2.2 Calculate the density of nitrogen gas at atmospheric pressure and at $20\ ^\circ$C if the mass of a mole of nitrogen molecules is 0.028 kg.

G2.3 How many molecules of gas do you need in a 100 cm^3 cylinder to exert a pressure of 1.0×10^8 Pa at a temperature of $800\ ^\circ$C?