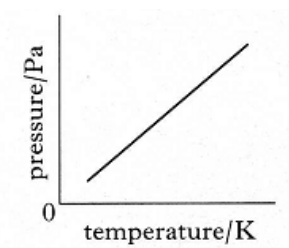# Gas Laws Answers – NAT 5

1) 80K.

2) 19,600Pa.

3)

4) 4000Pa.

5) a) 77K.

   b) The kinetic energy of the gas particles is directly proportional to their Kelvin temp.

   At 0K the gas particles will be stationary.

6) a)

Pressure (kPa)	100	150	200	250
Volume (cm^3)	14.7	9.9	7.4	5.9
P x V	1470	1485	1480	1475

   PV = Constant , mean constant = 1478 **=> PV = 1478**

   b) PV = 1478 => P x 5.0 = 1478 => **P = 296KPa**.

   c) The piston will be forced back up the syringe. When compressed, the air particles in

   the syringe hit the piston more per second than the particles outside.

   This will then force the piston upwards until the pressure inside equals the pressure

   outside.

   d) A longer tubing would increase the volume of gas in the experiment.

   However this would not be taken into account when recording the volume from the

   scale on the syringe. This will make the volume readings taken less accurate.

7) a) The assumption in the experiment is that the gas in the container is at the same

temperature as the water. The can must be fully immersed to allow the gas and

water temperature to be the same.

b) P_2 = 120kPa.

c) F = 120N.

d) The mass and volume of the gas has to be fixed in the experiment to keep the density

of the gas constant.

8) $0.05m^3$.

9) a) 120kPa.

b)

- Ek of the gas particles increases

- Number of collisions between the gas particles and the container walls per second
  increases

- Force exerted by the gas particles on the container walls increases

- Since P = F/A, the pressure of the gas P will increase

c) i) 0.7N.

ii) 35mm.

d) The temperature of the nitrogen gas can be measured directly rather than the water.

10) a) 274K = $1°C$.

b) i) 630N.

ii) 645N.

iii) Air passes into the box so that the pressure inside and outside of the box are equal.

This will then reduce the resultant force.

c) A minimum of **3 panels**.