**Gas Laws Viva**  Alex Hunter 2020

Opening question to be read exactly:

**Q) “What is a gas?”**

A gas is a substance that is in its gaseous phase, but is above its critical temperature.

**Q) What is critical temperature?**

Critical temperature is the temperature above which a gas cannot be liquefied no matter how high the pressure.

**Q) What is a vapour?**

A vapour in contrast is a substance in the gaseous phase but is below its critical temperature.

**Q) What are the ideal gas laws?**

The gas laws describe the way a perfect gas will behave given a certain set of conditions. This meaning under a certain Pressure, volume and temperature.

A perfect gas - ‘A gas which obeys all of the three gas laws completely.’

**Q) What is Boyle’s law**

‘At a constant temperature, the volume of a fixed amount of gas is inversely proportional to its pressure.’

In equation form:

V ∝ 1/P Or P x V = K (constant)

**Q) What is Charles’ law**

‘At a constant pressure, Volume of a fixed amount of gas is proportional to its absolute temperature.’

In equation form:

V ∝ T Or V / T = K (constant)

**Q) What is Gay-Lussac’s law / Third law**

‘At constant volume, Pressure of a fixed volume of gas will increase in proportion to absolute temperature.’

In equation form:

P ∝ T Or P / T = K (constant)

**Q) What is the universal gas equation**

PV= nRT

Where

n = the number of moles of the gas

R = the universal gas constant ( 8.31 J K-1)

Combination of gas laws as we know that P ∝ T and V ∝ T , we can then say that PV ∝ T

**Q) A fixed amount of gas obeying Boyle’s Law of volume 4L has it’s pressure doubled. What is the resultant volume?**

**P1V1 = P2V2**

**V2 = 4/2 = 2 L.**

**Q) What is Henry’s Law**

This describes the partial pressure exerted by gases which are dissolved in a liquid.

‘At constant temperature, the amount of gas dissolved in a liquid is directly proportional to the partial pressure of this gas in equilibrium with it.’

**Q) What is Dalton’s Law**

The total pressure of a gas mixture was the sum of the pressures of each of the gases if they were to exist on their own

Q) Can you apply this to atmospheric air at sea level?

Pressure of room air is 101.325 kPa.

Air is made up of the following:

78% nitrogen

21% oxygen

0.93% argon

<0.04% carbon dioxide

Hence

So for example nitrogen will exert 78% of that 101.325 kPa, or, roughly 79 kPa.

Oxygen 21%, roughly 21kPa.

Etc..The same goes for all the other gases.

If candidate doing well / time available

**Q) Can you graphically represent each of the three fundamental gas laws?**

