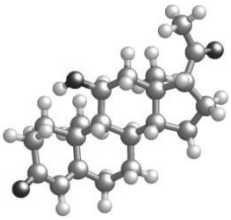

Chem!stry

Name: …… **( )**

Class: ……

Date: …… **/** …… **/** ……

The Ideal Gas Equation – Answers

Question One:

(a)

(i)

Volatile liquid:

Evaporates easily. Has a low boiling point, just above room temperature. Has a low latent heat of vaporisation.

Name of the equation:

The ideal gas equation.

"*n*" represents:

Number of moles of gas.

"*R*" represents:

The gas constant.

(ii)

To allow the gas to evaporate completely. To ensure that there is no unevaporated liquid left in the syringe.

To allow the gas to reach a uniform temperature of 100°C. To ensure that the gas has fully expanded.

(iii)

The molecules in a gas are moving randomly / chaotically.

The collisions between the gas molecules are perfectly elastic.

There is no intermolecular force of attraction between the gas molecules.

The gas molecules have a negligible volume / zero volume / are considered to be point masses.

(b)

(i)

$pV = nRT$

Make V the subject of the equation by dividing both sides of the equation by P:

$V = (nRT) \div p$

Number of moles of ethanol = mass in grams ÷ molar mass

Number of moles of ethanol = 0.167 ÷ 46.0

Number of moles of ethanol = 0.00363 moles

Convert temperature into Kelvin:

Temperature in K = °C + 273

Temperature in K = 100 + 273

Temperature in K = 373

Substitute the figures into the equation:

$V = (0.00363 \times 8.314 \times 373) \div 101\ 300$

$V = 11.26 \div 101\ 300$

$V = 0.000111\ m^3$

$V = 111\ cm^3$ (to three significant figures)

(ii)

The volume of the ethanol vapour (111.0 cm^3) exceeds the volume of the gas syringe (100 cm^3).