Name: …….. **Prep School:** ……

Chemistry **4 Questions [33 marks]**

1.



Fig. 1

a. This hot cup of tea can dissolve up to 12 5g sugar lumps. The cup is full and has a volume of 120ml. What is the solubility of the sugar in g per ml?

……

……

[2]

b. What is the name given to the sugar in this mixture? Ring **one** word:

Solvent Solute Solution Solvay Solvate

[1]

c. The cup of sugary tea was allowed to cool to room temperature and then filtered. The filter paper was dried and 10g of sugar was found to be present on the paper. What mass of sugar remained dissolved in the tea at room temperature?

……

[1]

d. What does this tell you about the solubility of sugar with temperature?

……

[1]

e. What word best describes how sugar particles dissolve in the tea? Ring **one** word.

Diffuse Suffuse Evaporate Melt React

……

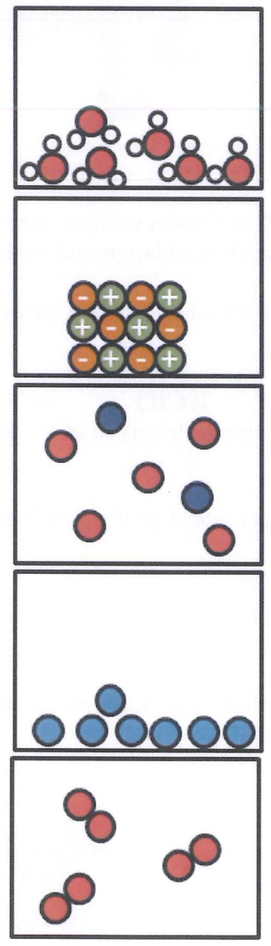
[1]

2.

Next to each of the following diagrams **write 3 words** that best describe the contents.
You can chose from the following (words may be used more than once).

Solid Liquid Gas Compound Molecule Element Salt

Atom H_2O Argon Ionic Mixture Oxygen



…… ……

…… …… ……

…… ……

…… …… ……

…… ……

…… …… ……

[15]

Turn Over

3.



Fig. 2

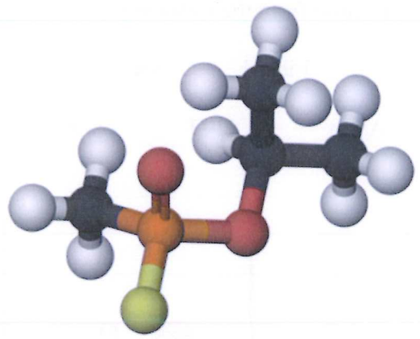


Fig. 3

During World War I chlorine gas was used to kill and maim soldiers, see *Fig 2*. When chlorine dissolves in moisture in the lungs it forms hypochlorous and hydrochloric acids.

a. Fill in the blanks to balance the following chemical equation showing the formation of these acids.

Cl_2	+	.....	→	HClO	+	.....
Chlorine		Water		Hypochlorous Acid		Hydrochloric Acid

[2]

b. What colour do you think blue litmus paper would go if placed in some water in which chlorine had been dissolved?

.....

[2]

These days chemical weapons are even more horrible. *Fig. 3*, shows the structure of the nerve agent ***Sarin***. The coloured balls represent atoms.

Colour of Ball	Atom Symbol
Black	C
White	H
Pale Green	F
Orange	P
Red	O

Table 1

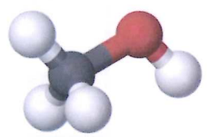


Fig. 4

The chemical formula of a compound can be written using chemical symbols and **subscript numbers** representing the number of each atom. Conventionally, carbon is written first; then hydrogen; then any other atoms **in alphabetical order**.

Fig. 4 shows the compound methanol. Applying these rules and using *Table 1*, methanol has the formula **CH_4O.** ie 1 carbon, 4 hydrogens and 1 oxygen.

c. Using *Table 1* and these rules write the chemical formula of ***Sarin***.

.....

[4]

4.

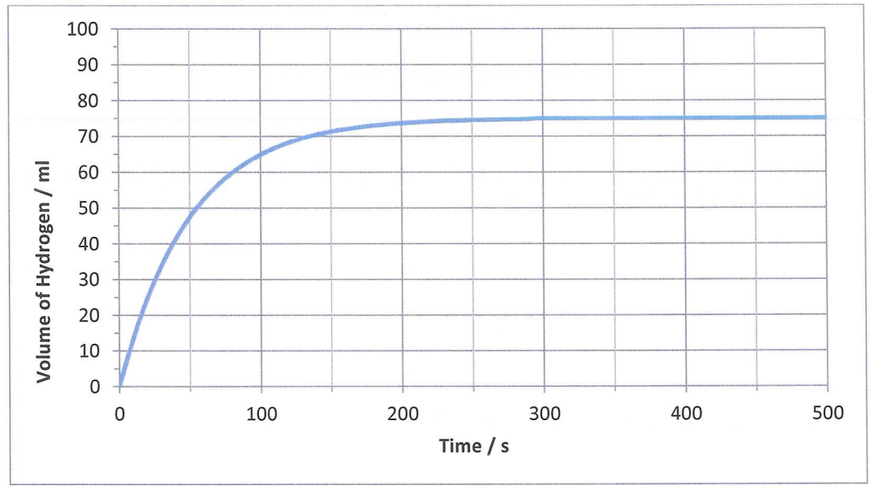


Fig. 5

When magnesium is added to hydrochloric acid hydrogen gas is produced. *Fig. 5* shows the volume of hydrogen gas produced with time when 50g of **powdered** magnesium is added to an **excess** of hydrochloric acid.

d. After how many seconds had the magnesium powder run out?

.....

[1]

e. What is the maximum volume of hydrogen produced in ml?

.....

[1]

f. Draw a line on *Fig. 5* to show how hydrogen is produced when **25g** of magnesium **lumps** are added to excess hydrochloric acid.

[2]

END