PRE ACCESS Workbook

Access to Higher Education

Chichester college

NAME: _____

Please complete all sections of this workbook

Unit title: Preliminary Assignment

INTRODUCTION TO CHEMISTRY WORK

Welcome to Chichester College and the start of a very busy but incredibly rewarding course. In preparation for September, I would like you to complete the following 5 questions.

QUESTION 1 - This question is about atomic structure and elements.
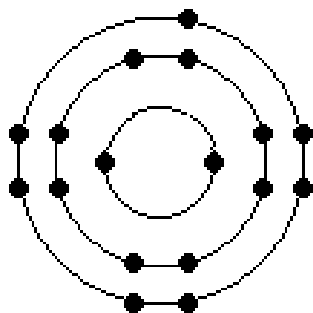
Give the chemical symbol of the non-metal atom represented by this diagram.

Answer:

- Complete the following 2 sentences.

The atomic number of an atom is the number of

....

The mass number of an atom is the number of

....

- Explain why an atom has no overall charge - use the relative electrical charges of sub-atomic particles in your explanation.

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- Explain why fluorine and chlorine are in the same group of the periodic table. Give the electron structures of fluorine and chlorine in your explanation.
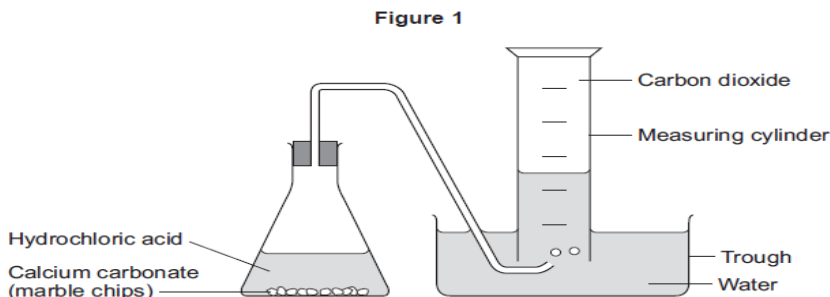
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QUESTION 2 - This question is about rates of reaction.

A student investigated the rate of reaction between calcium carbonate (marble chips) and hydrochloric acid.

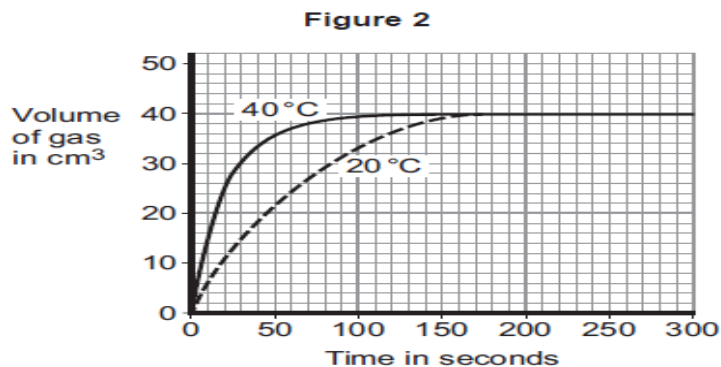The student used the apparatus shown in **Figure 1**.

Figure 1

The student:
- recorded the volume of gas collected every 5 seconds
- repeated the experiment using hydrochloric acid at different temperatures.

The equation for the reaction is:

$$CaCO_3(s) + 2HCl(aq) \longrightarrow CaCl_2(aq) + H_2O(l) + CO_2(g)$$

Here is the graph of results plotted from this experiment:

Figure 2

- Give a conclusion for the effect of temperature on rate of reaction

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- When the acid was at 60⁰C, the student had collected 30cm³ after 15 seconds. What was the average rate of reaction between 0-15 secs?

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- Explain in terms of particles and collisions, what effect increasing the surface area of the CaCO₃ would have on the rate of reaction
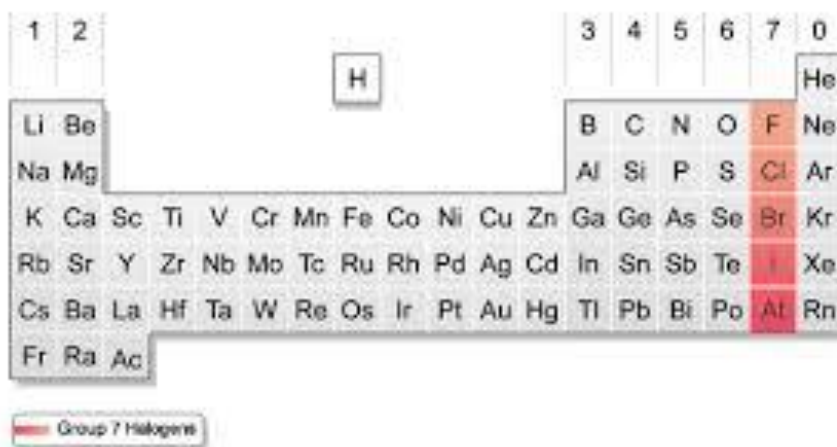
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QUESTION 3 - This question is about The Periodic Table.

This question is about the halogens (Group 7).

- How do the boiling points of the halogens change down the group from fluorine to iodine?

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- Sodium bromide is produced by reacting sodium with bromine. Sodium bromide is an ionic compound. Write down the symbols of the two ions in sodium bromide.

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- Chlorine reacts with sodium bromide solution to produce bromine and one other product. Complete the word equation for the reaction.

    chlorine + sodium bromide → ………………………………. + ……………………………….

- Why does chlorine displace bromine from sodium bromide?

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- Suggest which halogen could react with sodium chloride solution to produce chlorine.

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QUESTION 4 - This question is about bonding.

- Describe the structure and bonding in sodium chloride.

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- When sodium chloride solution is electrolysed, one product is chlorine. Name the two other products from the electrolysis of sodium chloride solution.

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- Many people do not have enough iodine in their diet. Sodium chloride is added to many types of food. Some scientists recommend that sodium chloride should have a compound of iodine added. Give one ethical reason why a compound of iodine should not be added to sodium chloride used in food.

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- The bonding in iodine is similar to the bonding in chlorine. Draw a diagram to show the covalent bonding in iodine. *Show the outer electrons only.*

- Explain why iodine has a low melting point.

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- Explain, in terms of particles, why liquid iodine does not conduct electricity.

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QUESTION 5 - This question is about chemical quantities.

- Calculate the mass of H_2O required to react completely with 5.0 g of $SiCl_4$:

$$SiCl_4 + 2H_2O \rightarrow SiO_2 + 4HCl$$
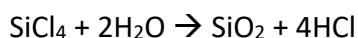
- Calculate the mass of phosphorus required to make 200 g of phosphine, PH_3, by the reaction:

$$P_4(s) + 3NaOH(aq) + 3H_2O(l) \rightarrow 3NaH_2PO_4(aq) + PH_3(g)$$
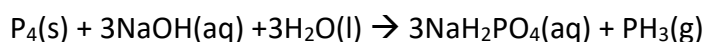
- Lead (IV) oxide reacts with concentrated hydrochloric acid as follows:

$$PbO_2(s) + 4HCl(aq) \rightarrow PbCl_2(s) + Cl_2(g) + 2H_2O(l)$$
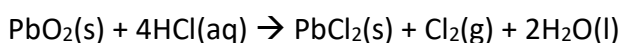
What mass of lead chloride would be obtained from 37.2g of PbO_2, and what mass of chlorine gas would be produced?

- When copper (II) nitrate is heated, it decomposes according to the following equation:

$$2Cu(NO_3)_2(s) \rightarrow 2CuO(s) + 4NO_2(g) + O_2(g).$$
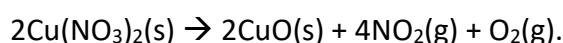
When 20.0g of copper (II) nitrate is heated, what mass of copper (II) oxide would be produced? What mass of NO_2 would be produced?

- A blast furnace can produce about 700 tonnes of iron a day. How much iron (III) oxide will be consumed? Assuming coke is pure carbon, how much coke would be needed to produce the necessary carbon monoxide?

$$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(l) + 3CO_2(g)$$

$$2C(s) + O_2(g) \rightarrow 2CO(g)$$
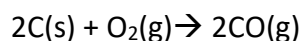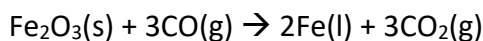
Intro to Human Physiology

Integu-mentary System   Muscular System   Skeletal System   Nervous System   Endocrine System   Circulatory System
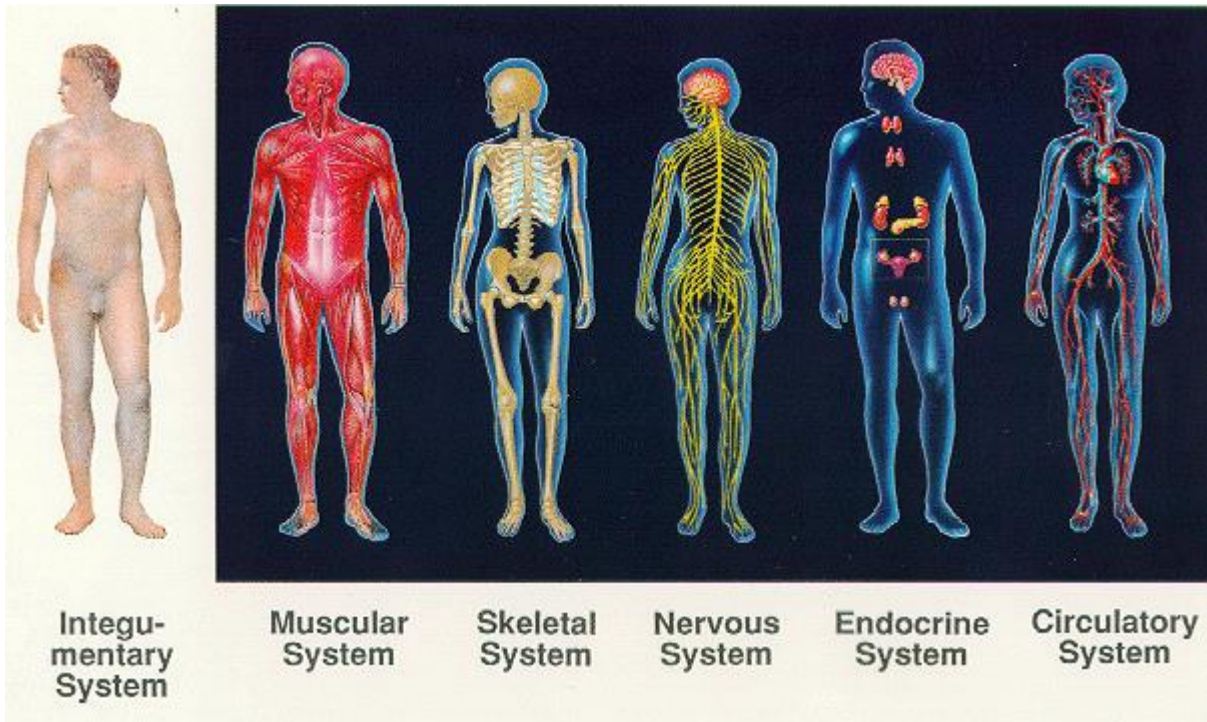
LO: Be able to discuss the structures of the body

This section of the workbook can be written or typed. Be succinct, and do not exceed available space.

Q1   A cell is a basic unit of a living organism. Research and draw a cheek cell. This should be labelled.

Q2   Cells can be specialised to perform different functions. Choose one of the cells listed, draw it and then explain how it has been specialised for its role. Choose from: muscle cell, intestinal epithelial cell, or alveolar cell.

Q3   The human body is made up of cells organised into tissues, organs and organ systems. Using an example of your choice, explain how this organisation works (i.e. what cells are present? How are they organised into tissues? What tissues are present in the organs? What organs are present in the system?

Q4   Humans have lots of sets of muscles, many of which are described as being antagonistic. What does this word mean in this context?

Q5   Humans have serious problems if damage occurs to the nervous system. Unlike our muscles or skin, our nerves are too specialised to easily regenerate. Why would this mean that damage is hard to repair within the nerves?

Q6   Humans need to get their nutrients from food (via the digestive system) and mix them with Oxygen (obtained via the respiratory system) in order to produce energy. All of these things are carried from their intake points around the body in the blood (which is part of the cardiovascular system). Why does material have to be carried from place to place? Why can we not rely on diffusion to move this material around? (It would be advisable to start with a definition of diffusion)

End of biology questions…

PRE ACCESS Workbook

INTRODUCTION TO MATHS WORK

Fractions
Work out (show your work)

1 - $\frac{18 - 2 \times 3}{8 \div 2}$

2 - $0.516 \div 0.8$

3 - $\frac{6}{11} + \frac{7}{9}$

4 - $\frac{6}{7} - \frac{3}{5}$

5 - $\frac{9}{10} - \frac{5}{6} + \frac{3}{12}$

6 - $\frac{4}{11} \times \frac{5}{10} \div \frac{7}{22}$

Decimals
Write the decimals as a fraction in its simplest form

7 - 0.12

8 - 0.084

9 - 0.375

10 - Show that $4\frac{1}{2} \div 1\frac{2}{5} = 3\frac{3}{14}$

Ratio

11 - Two towns 4.8km are shown on a map 12cm apart. Find the ratio of the map distance to the true distance in the form $1:n$.

12 - A tiled floor has blue and white tiles in the ratio 9:4. What fraction of the tiles are blue?

13 - $\frac{1}{8}$ of some counters are red, $\frac{5}{8}$ are blue and rest are green. Find the ratio of red to blue to green.

14 - Ashley and Cameron have a combined age of 20. Cameron is 10years older than Ashley. Find the ratio Ashley's age to Cameron's age in its simplest form.

Percentage

15 - A farmer has 380 acres of land. He sells 35% of his land. How much does he have left?

16 - Alan's weekly wage of £400 is decreased by 4.75%. Mary's weekly of £350 increased by 9.26%. Who now earns more and by how much?

17 - 2 years ago, Tom earned £31 000 per year. Lat year, he got a got rise of 3%. This year, he got a pay cut of 2%. How much does he now earn per year?

18 - A café sells 270 ice cream sundaes in April and 464 in May. Find the percentage increase in ice cream sales.

Algebra

Solve:

19 - $15 - 2x = 7$

20 - $\frac{x}{3} + 2 = -3$

21 - $x(2x - 3) = 0$

22 - $x^2 - 2x - 8 = 0$

23 - $5x^2 + 3x - 2 = 0$

Statistics

Write the definition of words:

24 - Mean, Mode, Median

25 - Discrete and Continuous data

26 - Primary and Secondary data

27 - Qualitative and Quantitative data