

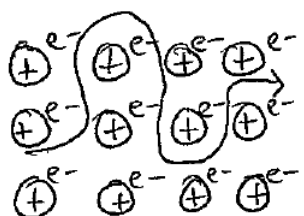
Question 6

Candidate 1

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

Electrons live on the outside of the nucleus.
 They have a negative charge.
 They conduct electricity.
 They have a structure of delocalised electrons



electrons are free to move
 so can conduct electricity

They have a mass number of 0.

Candidate 2

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

- atoms can gain or lose electrons to gain a full outer electron shell
- electrons weigh practically nothing
- electrons have a charge of -1
- delocalised electrons allow metals to conduct electricity
- when atoms gain or lose electrons they become ions
- if an atom loses electrons it will gain a positive charge whereas if an atom gains electrons it will have a negative charge
- having a full outer electron shell allows an element to be stable

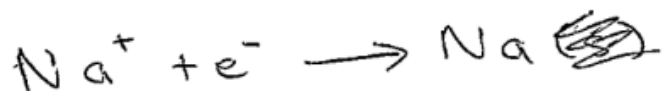
Candidate 3

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

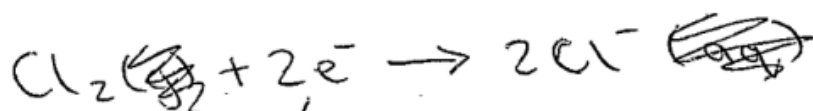
electrons are what keeps an atom at a stable 'state'. The outer electron shells signify whether an atom is stable or not. For example Neon from group 8/0 has a full outer electron shell making this element very unreactive, in fact argon another element from group 8/0 is used in light ~~tubbs~~ bulbs because its so unreactive. The number of electrons required for an element until its stable is 8. So elements are able to obtain a full outer electron shell by losing/gaining an electron. Metals lose electrons to become positive ions. Non-metals gain electrons to become negative ions. Electrons have a negative charge & don't exactly have a mass of 0 however the mass of an electron is very close to 0, hence why we call the mass 0. We can also ~~write~~ write ion-electron equations to display how many electrons an element loses or gains.

Q6) For e.g. The ion-electron equation for ~~sodium~~ would be:



loses an electron to become ~~a~~
stable atom with a full
outer electron shell.

For e.g. Chlorine is a diatomic element so it doesn't just ~~lose~~ ^{gain} one electron, gains two.



Chlorine would have originally gained only one electron but because the element is diatomic it will gain two electrons.

Q6)

ADDITIONAL SPACE FOR ANSWERS AND ROUGH WORK

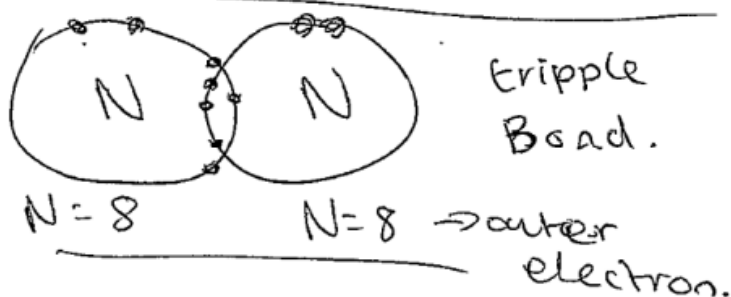
Group Metals	charge
1	1+
2	2+
3	3+

even though their losing electrons the ion remains positive, this only applies to metals.

Non-metals ~~lose~~ gain electrons but have positive ions.

Bonds in diatomic elements.

Nitrogen:



Candidate 4

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

- Electrons ~~play~~ have an important role in chemistry as they:
 - Decide the valency of an element
 - ~~Determine whether an ion is positively or negatively charged. Electrons are negatively charged. The more electrons the more negative the charge.~~
 - Beta radiation would not exist ~~if it~~ without electrons, because it is an electron
- Electrons determine ~~with~~ if a charged ion is positively or negatively charged. (or electron composition)
- ~~Electrons~~ A different amount of electrons on atoms of the same element create isotopes.
- Electrons allow electric current to pass through a compound / solution.

Candidate 5

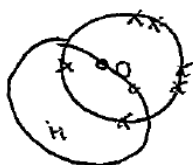
6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

Electrons are used to allow an atom to become Stable.

Electrons are used in bonding:

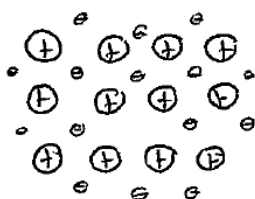
Covalent bonding is the bonding between 2 non metals, ~~sharing outer electrons~~ for example the Covalent molecule and two nuclei with a shared pair of electrons



OH

Hydrogen has given Oxygen two of it's outer electrons allowing Oxygen to have a full outer Electron Shell

Metallic bonding is the bonding between two metals this is in the form of ~~ionic~~ ^{metallic} lattice this is protons in a sea of delocalised electrons



Electrons are also part of the nuclear chemistry and can otherwise be known as Beta, they have a mass of 0 and a charge of -1

Candidate 6

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

Electrons are ~~the~~ the negative subatomic particle in atoms. They are stored in the electron shell. The electrons determine how reactive elements are, for example, Group 7 elements, which have 7 electrons in their outer electron shell are very reactive but elements in Group 0/8 don't react at all as they have a full electron shell with 2 or 8 electrons in their outer shell. Electrons make ions by losing or gaining electrons. For example Metals form positive ions (Li^+) because they ~~prefer to~~ lose electrons and non metals form negative ions (O^{2-}) as they gain electrons. Electrons spread electricity in metals, metal lattices and carbon in the form of graphite as they have delocalised electrons (electrons that are free to move around) so they can spread charges.

Candidate 7

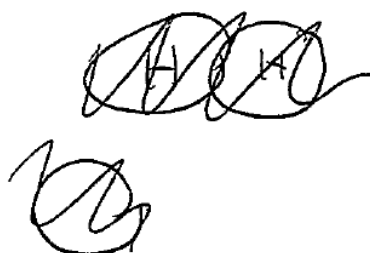
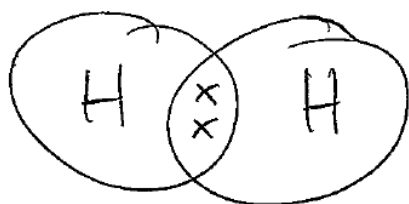
6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry. 3

- electrons have a negative charge
 - electrons weigh virtually nothing
 - the nuclide notation for an electron is ${}^0_{-1}\text{e}$
 - electrons are involved in reduction reactions
 - In electrolysis positive metal ions gain electrons to become atoms at the negative electrode. This is called reduction
 - An example of an reduction reaction is; $\text{Ca}^{2+}(\text{aq}) + 2\text{e}^{-} \rightarrow \text{Ca}(\text{s})$
 - In electrolysis the electrons flow through the wires from the most ~~to least~~ reactive metal to the less reactive metal
 - ~~Beta is a type of radiation that gives out electrons~~
- (continued on additional space)

6 Continued) Non-metal ions have a negative charge so therefore they have more electrons than protons

In covalent bonds ~~atoms~~ atoms share electrons to become more stable for example;



Covalent bonding is the electrostatic force of attraction between two nuclei & a shared pair of electrons

Group 0 is called the Noble Gases and they are unreactive because they have a stable electron arrangement where as other groups such as the alkali metals are very reactive because they have an unstable electron arrangement.

Candidate 8

6. English physicist JJ Thomson discovered the electron in 1897.

Using your knowledge of chemistry, comment on the role of electrons in chemistry.

3

Electrons are negatively charged so can therefore make an ion negatively charged. Electrons orbit around ~~the nucleus~~ instead of being inside the nucleus. Electrons ~~was~~ are arranged in shells and that's how elements are arranged in a periodic table, based on their outer electrons. This means if an element has the same number of outer electrons they ~~it~~ have similar chemical properties, like a homologous series. Covalent bonding shares electrons.

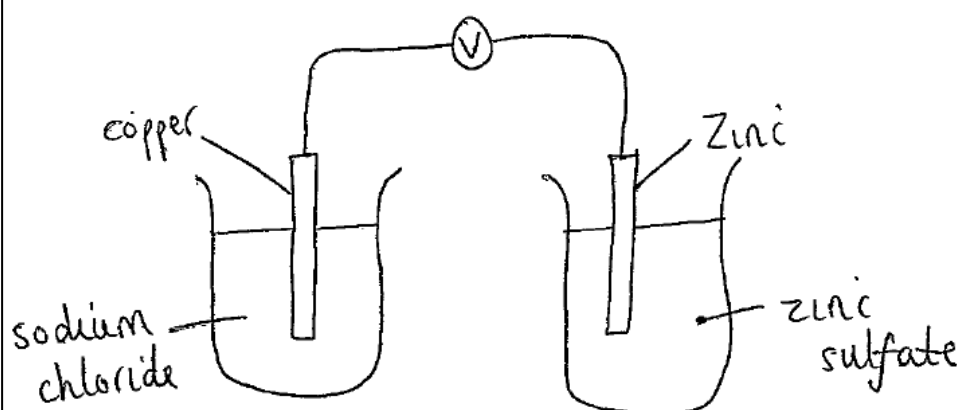
Question 12

Candidate 1

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

Sodium chloride is ionic. This means it is made from a metal + a non-metal. Sodium chloride is also an electrochemical series because it can conduct electricity in a solution form. It is also a base. This means it will help bring an acidic solution up to pH 7.



This shows NaCl is a conductor of electricity + ~~the~~ has delocalised electrons.

Candidate 2

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

- Sodium chloride can be produced when sodium oxide and hydrochloric acid are reacted together to form a soluble salt and water
- ~~sodium chloride is covalent as it is a non-metal~~
- sodium chloride is very soluble
- sodium chloride has ionic molecular bonding as it is a metal and a non-metal
- sodium chloride ~~is~~ has high melting and boiling points
- sodium chloride can conduct electricity when in solution or molten

Candidate 3

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

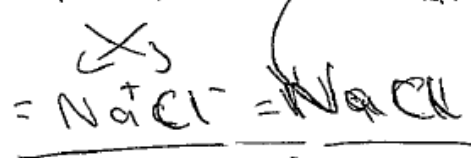
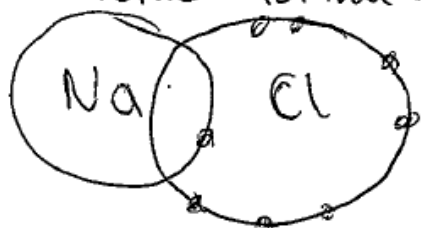
~~Na Cl~~ The compound NaCl contains the elements Sodium & Chlorine & we know Sodium is ~~an~~ ~~atom~~ a metal & chlorine is a non-metal. ~~This therefore tells us that this is a covalent bonding. Covalent bonding is when a non-metal & metal join together to share electrons in order to obtain a stable outer shell. In other word positive & negative ions together to share electrons.~~

From data booklet we know

this ionic compound which
melting point = 802°C Boiling point = 1465°C

Shape of compound is ~~an~~ linear as there is only two elements.

Ionic formula for Na Cl chemical formula



chlorine is diatomic meaning it has 2 elements.

Also very

[END OF QUESTION PAPER]

soluble.

Candidate 4

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

- Sodium chloride is a salt which can be made from reacting sodium with hydrochloric acid.

- ~~It is a salt.~~
- The shape of a sodium chloride molecule is linear Na-Cl
- It is an ionic compound because it consists of a metal (sodium) & a non-metal (chlorine)
- It ~~cont~~ is made up of 2 atoms making it diatomic.

Candidate 5

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

Sodium Chloride can be the result of a neutralisation
Reactions ~~involving~~ the ^{word:} equation for these would be:

Sodium oxide + Hydrochloric acid $\longrightarrow$ Sodium Chloride + water

Sodium hydroxide + Hydrochloric acid $\longrightarrow$ Sodium Chloride + water

Sodium Carbonate + Hydrochloric acid $\longrightarrow$ Sodium Chloride + water + carbon dioxide

Sodium chloride has ionic bonding this means there is an electrostatic force of attraction between positive and negative ions

Sodium chloride can conduct electricity but only in liquid or molten form.

One use of sodium chloride is that you can use it to season your food.

Candidate 6

	hydroch	MARKS
12.	Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions. Using your knowledge of chemistry, comment on the chemistry of sodium chloride.	3
	Sodium Chloride is made in a neutralisation reaction at Sodium chloride and water is made in a neutralisation reaction with hydrochloric acid and sodium oxide. Sodium chloride is very soluble and will be removed from the water by evaporating it. Sodium Chloride is an ionic compound which means it will conduct electricity when molten or in solution. The ionic formula of sodium chloride is NaCl^-. The gram formula mass of Sodium Chloride is 58.5g. Sodium chloride has a melting point of 802°C and a boiling point of 1465°C. The flame colour of Sodium Chloride is yellow	

Candidate 7

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

The bonding in NaCl is ionic bonding. Ionic bonding is the electrostatic force of attraction between ~~positively~~ positively charged ions and delocalised electrons.

NaCl contains chlorine which is a diatomic element.

→ In ionic bonding when the compound is solid it doesn't conduct because ~~the~~ the electrons are held in an ionic lattice but when it's liquid the lattice breaks down and the electrons are then free to move so conduct.

Sodium is a metal and Sodium is in group one which is the alkali metals so it's very reactive

Chlorine is a non-metal and is in group 7 which are the halogens which are also reactive

~~Sodium chloride has the relative atomic mass of~~

[END OF QUESTION PAPER]

(continued
in
additional
space)

12 continued) Sodium chloride is a salt which is formed from an acid with a base. These are called neutralisation reactions.

Some examples of neutralisation reactions are;

metal oxide + acid $\rightarrow$ salt + water

metal carbonate + acid $\rightarrow$ carbon dioxide + salt
+
water

metal hydroxide + acid $\rightarrow$ salt + water

• water is always produced in neutralisation reactions

Candidate 8

12. Sodium chloride, NaCl, is commonly known as table salt. It has several uses and is also a product in some common chemical reactions.

Using your knowledge of chemistry, comment on the chemistry of sodium chloride. 3

Salt can be formed by many reactions

metal oxide + ~~water~~^{acid} $\rightarrow$ salt + water

metal hydroxide + acid $\rightarrow$ salt + water

metal carbonate + acid $\rightarrow$ salt + water + carbon dioxide

Sodium chloride is sodium and chlorine
together

Since sodium chloride is a salt, it's also a base
and an alkali