Weeks 3 and 4 (300 minutes/3 double periods)/5hrs of work): Metal & Non-metal half cells and Plastics

Starter:

1. What is the energy change in a battery?
2. Where do the electrons flow in an electrochemical cell?
3. In terms of the electrochemical series in which direction to metals flow?
4. How do you create a larger voltage in an electrochemical cell?
5. What is the purpose of the electrolyte in an electrochemical cell?
6. What are the definitions of Oxidation and Reduction?

Learning intentions:

- Be able to state what a metal – metal half-cell is
- Be able to state which direction and where the electrons flow in a metal – metal half cell
- Be able to state what a non-metal – non-metal half-cell is
- Be able to state which direction and where the electrons flow in a non-metal – non-metal half cell
- Be able to define addition polymerisation
- Be able to draw a polymer from its monomers
- Be able to draw the repeating unit and monomers from a polymer structure

Notes (pgs 30 to 38 of printed notes). https://teams.microsoft.com/l/file/C03899F1-AF68-492F-A8E2-81882F70E591?tenantId=ccd32ca3-16ce-428f-9541-

These do not need to be copied into a jotter but read through and then highlight key sections of pages mentioned in printed notes. A link to where they are on Teams is above, you should also have a paper copy if you've been into school to pick your pack up.

If you wish to add any detail to your printed notes, feel free and please try and fill in the blanks. **Please also revise all your notes from distance learning and re-listen to my voiceovers at the same time as you read over them.**

If you're struggling please just ask away on the chat section of our Team.

Please also complete **exercise 5 and 6** at the back of the notes booklet.

Self-check answers for last week's questions are on the next few pages and questions for this week for you to complete are on the next few pages and your homework task is at the end of this document. Answers to the starter questions will also be at the back.

Answers to last week's Self Checks:

Self Check Answers 12

1. (a) An ionic solution which conducts electricity.

(b) From zinc to copper

(c) it loses electrons

Self Check Answers 13

1. (a) Oxidation

(b) to complete the electrical circuit

Self Check Answers 14

1. (a) reduction

(b) oxidation

(c) reduction

(d) oxidation

(e) oxidation

(f) reduction

(g) reduction

(h) reduction

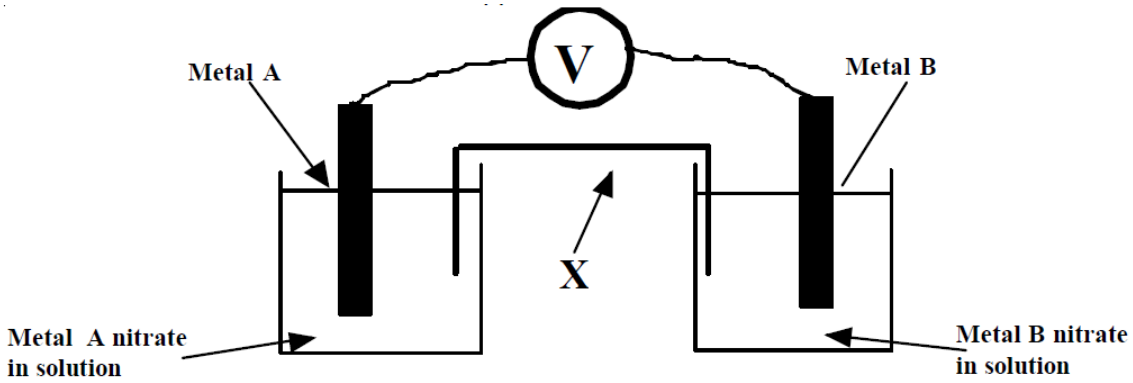
(i) oxidation

(j) reduction

Questions for this week

Extra Work - Self Check 20

1. A series of metals were tested in the apparatus shown below.



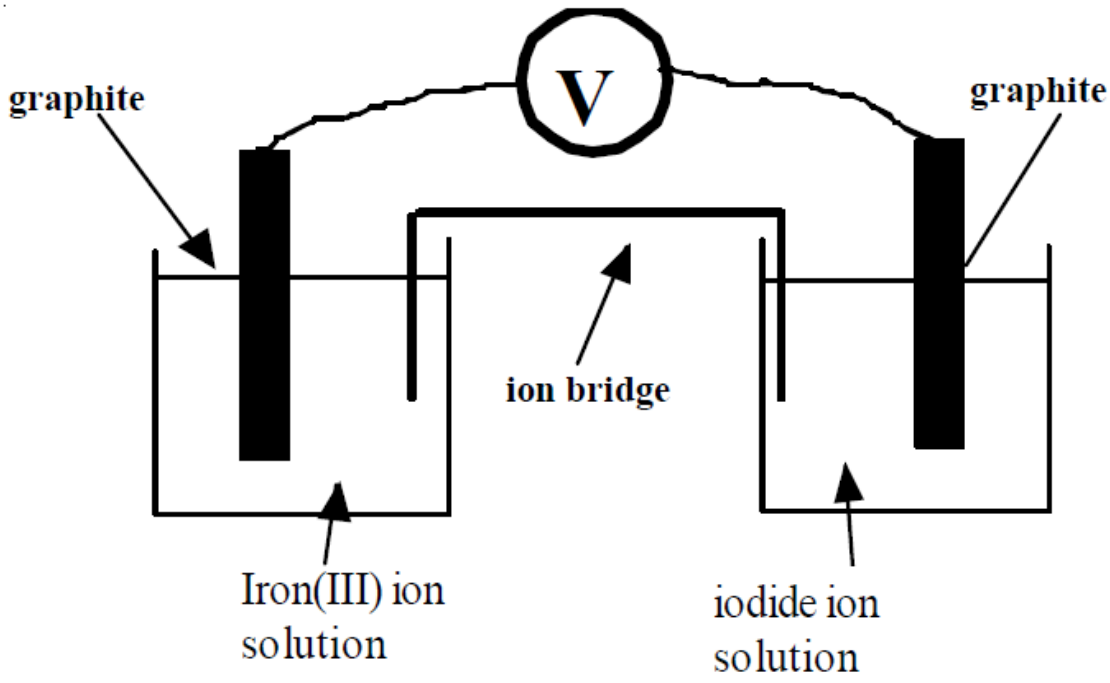
(a) What name is given to the piece of apparatus labelled **X** ? What could this be made from?

(b) For each of the following pairs of metals give the direction of electron flow.

1	magnesium	zinc
2	zinc	copper
3	copper	magnesium
4	silver	copper
5	zinc	iron

Extra work Self Check 21

1. A flow of electrons was produced from the following experiment.



The change occurring in the iron(III) ion solution was:

$Fe^{3+} + e \dashrightarrow Fe^{2+}$

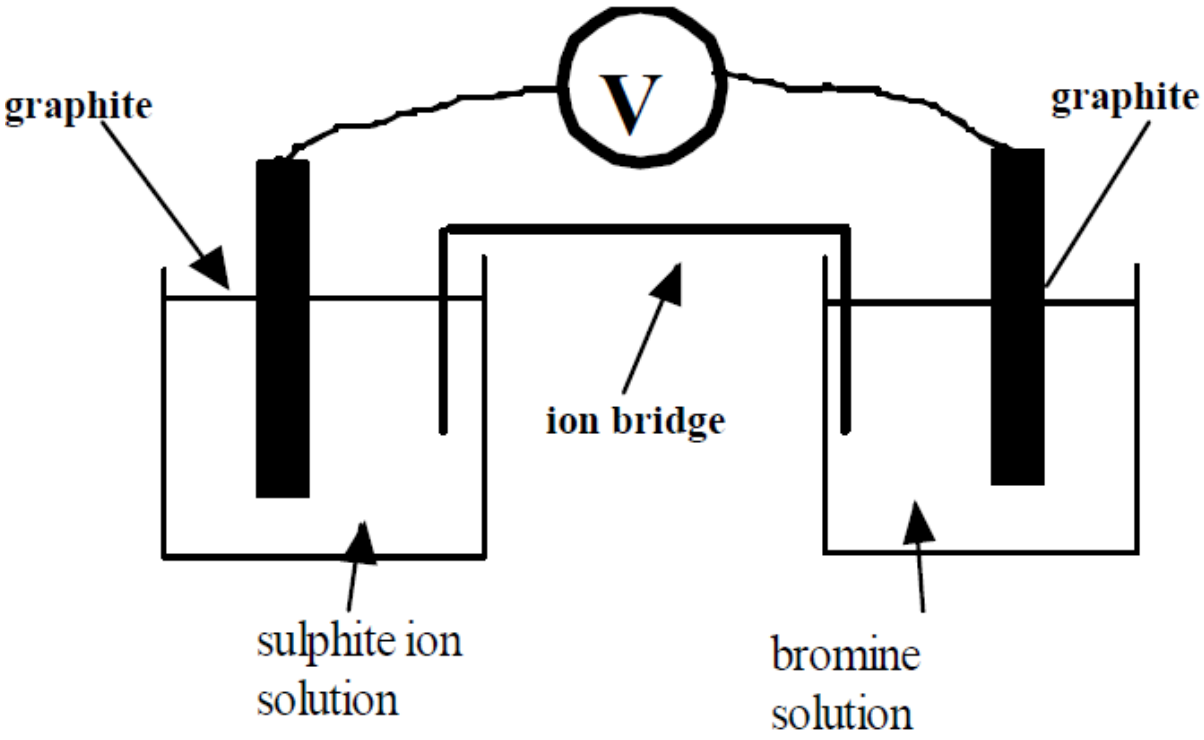
(a) What name is given to the change which occurs in the iron(III) ion solution?

(b) Give the ion electron equation for the reaction which occurs in the iodide ion solution.

(c) What is the direction of flow of electrons in the above experiment?

Extra Work Self Check 22

1. A flow of electrons was produced from the following experiment.



The change occuring in the sulphite ion solution was:

$SO_3^{2-} + H_2O$ ---> $SO_4^{2-} + 2H^+ + 2e$

(a) What name is given to the change which occurs in the sulphite ion solution?
(b) Give the ion electron equation for the reaction which occurs in the bromine solution.
(c) What is the direction of flow of electrons in the above experiment?

Self Check 1

1. Many items which were once made from other materials are now made of plastic, e.g. plastics have almost completely replaced iron for drainpipes and guttering. Plastics can offer many advantages but they do have some drawbacks.

(a) State two reasons why plastics are preferred for drainpipes and guttering.

(b) State two problem which can arise from the use of plastics.

2. Most synthetic polymers are not biodegradeable. To dispose of plastics they are often burned, although this can produce toxic fumes.

(a) Explain the meaning of the term "biodegradeable".

(b) Name a toxic gas which can be produced from the burning of plastics.

3. Many modern articles are made from thermoplastic polymers. Examples of these are washing up basins, cups, and computer cases. Other objects such as pot handles are made from thermosetting polymers.

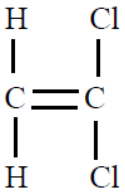
(a) Explain the meaning of the underlined words.

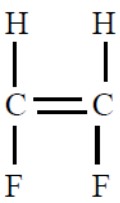
(b) Why are thermoplastics used to make difficult shapes such as computer casings?

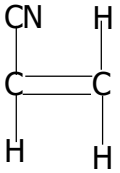
(c) Why are thermosetting polymers used on pot handles?

Self Check 2

1. Draw the structure of the polymers formed from the following monomers. Show three monomer units joined in each case.

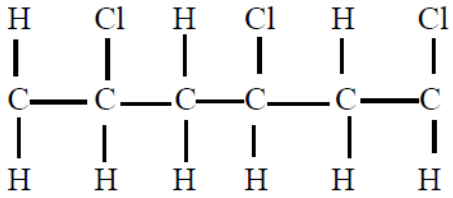
a) 

b) 

c) 

2. Polyvinyl chloride (PVC) is a thermoplastic polymer made from vinyl chloride.

The structure of a part of a PVC molecule is shown below.



(a) Work out the structural formula and molecular formula of vinyl chloride.

(b) What type of reaction occurs when vinyl chloride forms PVC?

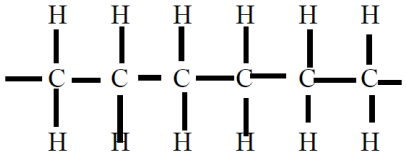
(c) Draw the repeat unit in vinyl chloride.

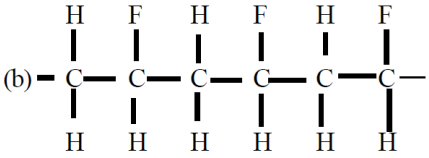
Self Check 3

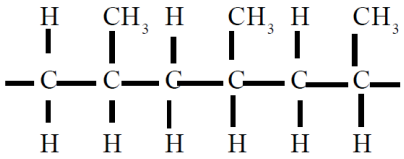
1. The following molecules are all addition polymers, for each of these work out

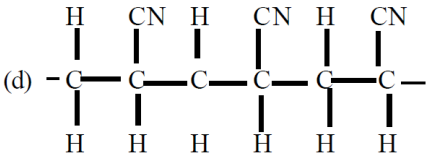
(i) The repeat unit

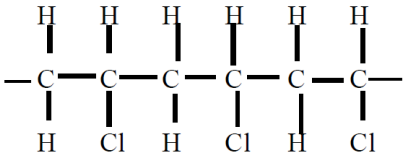
(ii) The molecular and structural formula of the monomer

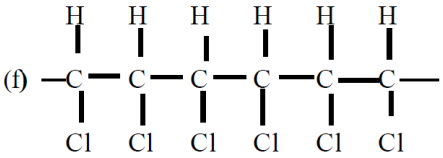
(a) 

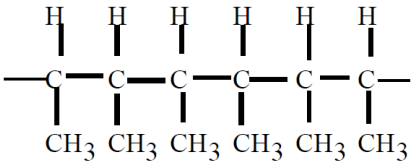
(b) 

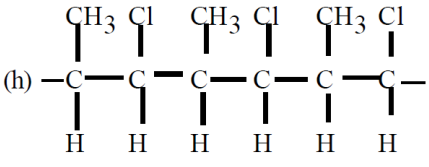
(c) 

(d) 

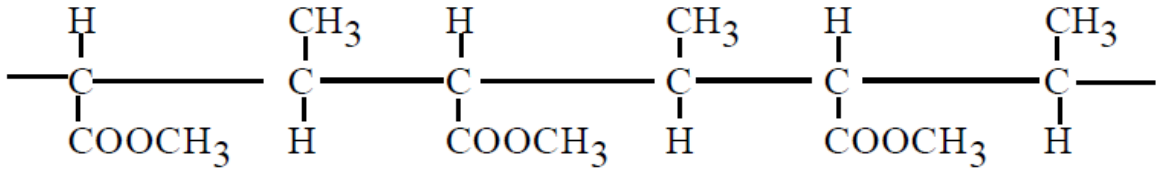
(e) 

(f) 

(g) 

(h) 

2. Perspex is a transparent polymer used in safety screens. The diagram below shows part of a molecule of perspex.



Homework deadline

Homework 9 (Electrochemical Cells, half cells with non-metals) Friday 12th February 3pm.

This should be submitted on the Team through the class notebook and assignments section as we have been doing all year. Either type your answers directly into the notebook or post photos of your answers written on paper.

Answers to starter questions:

1. Chemical to electrical
2. Through the wires
3. From the metals higher up in the ECS to metals lower down in the ECS
4. Use two metals which are further apart from each other.
5. To complete the circuit by allowing ions to flow
6. Oxidation is loss of electrons and Reduction is gain of electrons.