



Chem!stry

Name: ()

Class:

Date: / /

Introduction to Electrolysis

Macroconcepts: Systems and Change

Enduring Understanding: Electrolysis is a system that brings about change.

Question 1: What do you understand by the term *system*?

Question 2: What is your understanding of the term *change*?

Question 3:

Electrolysis is the chemical decomposition of a compound by passing electricity through it. Why is it important for chemists to put a compound into a *system* that causes it to *change* into simpler products?

.....
.....
.....
.....

Question 4:

Define the term *electrolysis*.

.....

.....

Question 5:

a) Which types of chemicals can be electrolysed (*i.e.* are electrolytes)?

.....

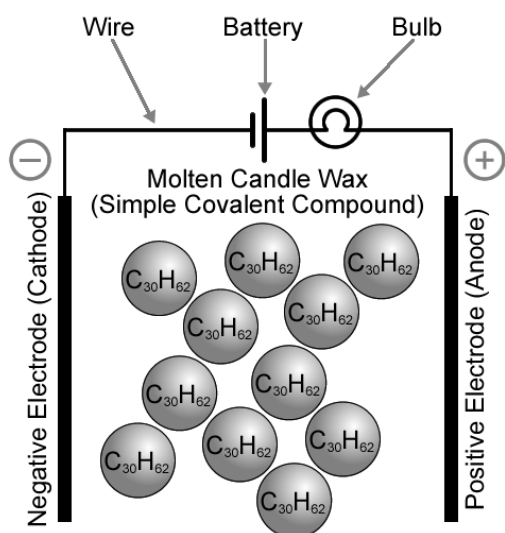
.....

b) Which types of chemicals cannot be electrolysed (*i.e.* are not electrolytes)?

.....

.....

Question 6:



Explain why simple covalent compounds cannot conduct electricity and are not decomposed by electricity.

.....

.....

.....

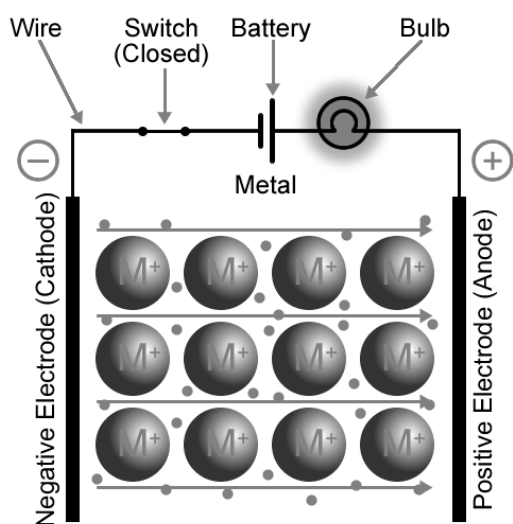
.....

.....

.....

.....

Question 7:



Explain why metals are able to conduct electricity in both the solid and molten states without decomposing.

.....

.....

.....

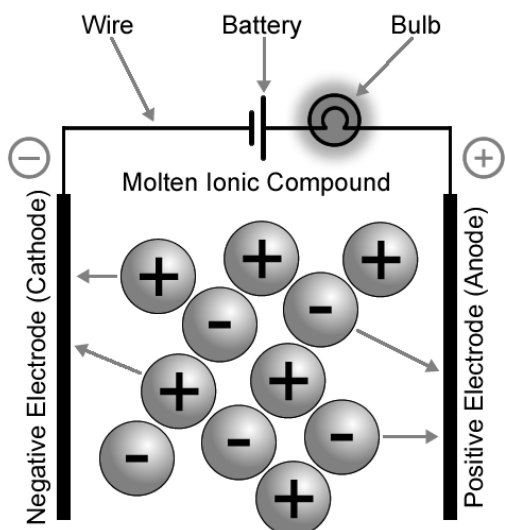
.....

.....

.....

.....

Question 8:



Explain why molten and aqueous solutions of ionic compounds decompose when electricity is passed through them.

.....

.....

.....

.....

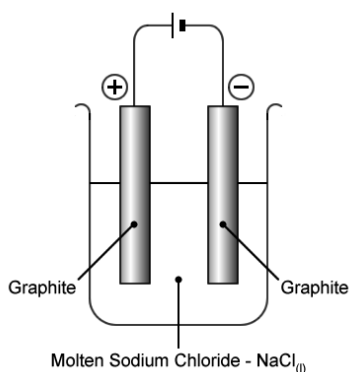
.....

.....

.....

Question 9:

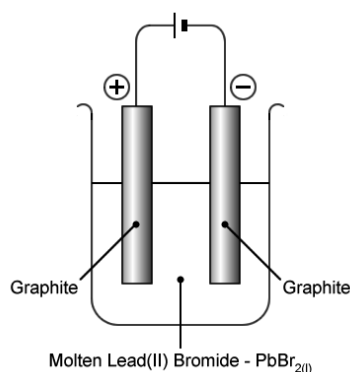
Describe what happens when the following ionic compounds, each in its molten state, are electrolysed.



Anode:

Cathode:

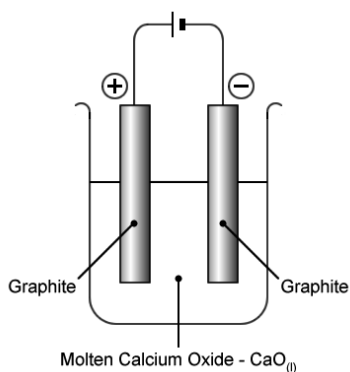
.....



Anode:

Cathode:

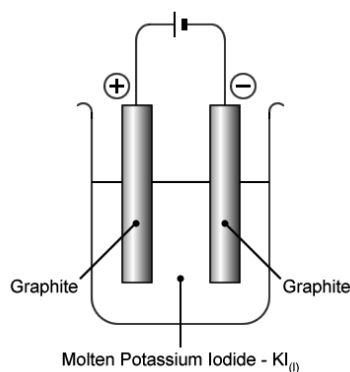
.....



Anode:

Cathode:

.....

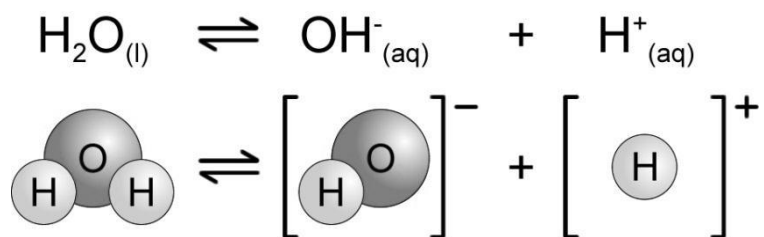


Anode:

Cathode:

.....

Question 10:



Which four ions are present in an aqueous solution of sodium chloride?

Anion #1: Anion #2:

Cation #1: Cation #2:

Question 11:

Study the electrochemical series given below. What rules are used to determine which *cation* will be preferentially *reduced* when the aqueous solution of an ionic compound is electrolysed?

- Potassium – K⁺
- Sodium – Na⁺
- Calcium – Ca²⁺
- Magnesium – Mg²⁺
- Aluminium – Al³⁺
- Zinc – Zn²⁺
- Iron – Fe^{2+ / 3+}
- Lead – Pb²⁺
- Hydrogen – H⁺
- Copper – Cu²⁺
- Silver – Ag⁺

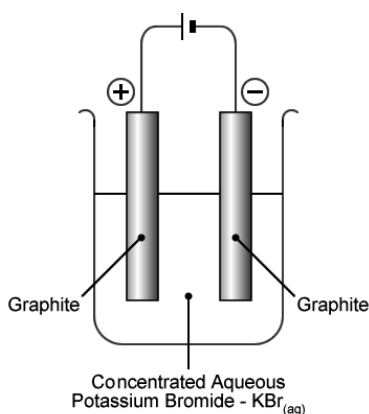
Question 12:

What rules are used to determine which *anion* will be preferentially *oxidised* when the aqueous solution of an ionic compound is electrolysed?

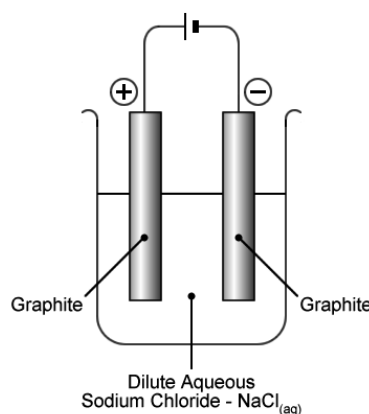
- Sulfate – SO₄²⁻
- Nitrate – NO₃⁻
- Chloride – Cl⁻
- Bromide – Br⁻
- Iodide – I⁻
- Hydroxide – OH⁻

Question 13:

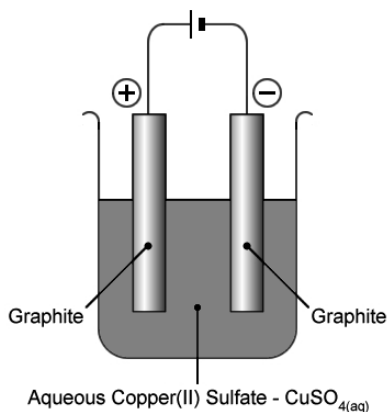
Describe what happens when aqueous solutions of the following ionic compounds are electrolysed.



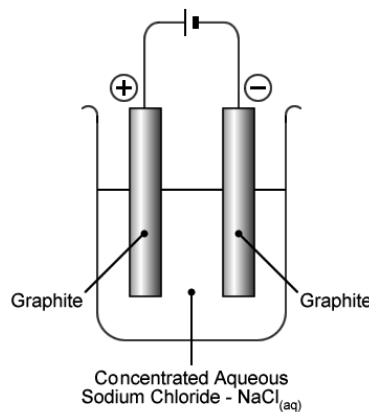
Anode:
 Cathode:



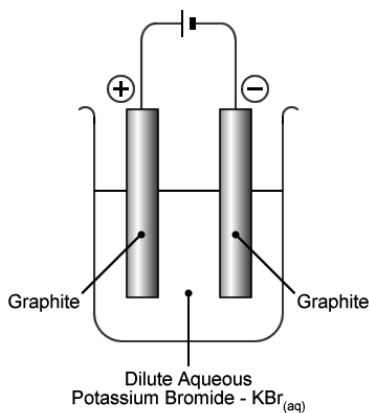
Anode:
 Cathode:



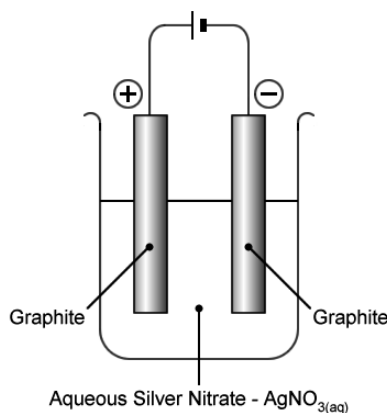
Anode:
 Cathode:



Anode:
 Cathode:



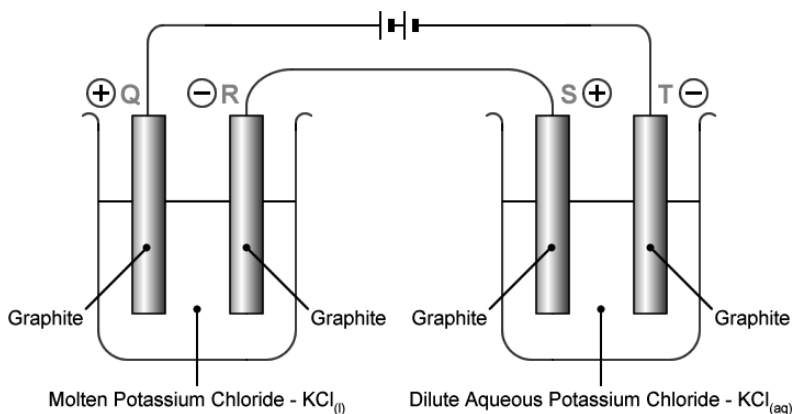
Anode:
 Cathode:



Anode:
 Cathode:

Question 14:

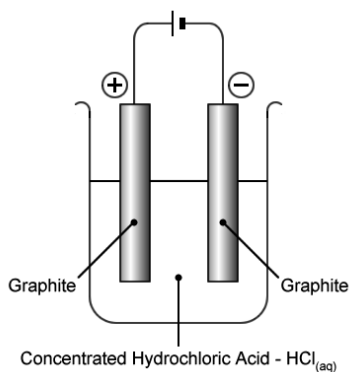
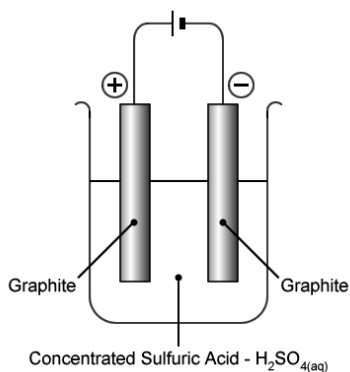
Describe what happens when electricity is passed through the following system.



.....

Question 15:

Describe what happens when the following acids and alkalis electrolysed.



Anode:

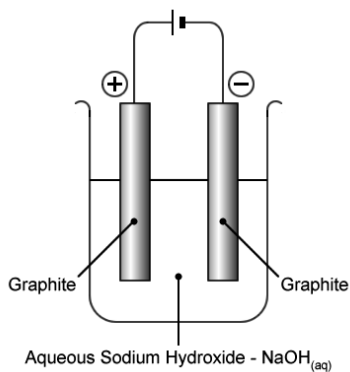
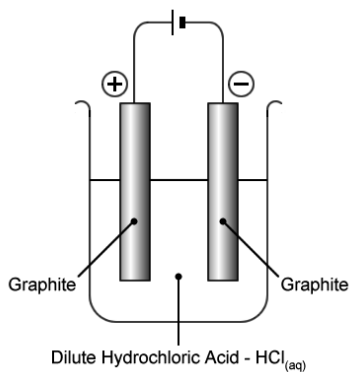
Anode:

Cathode:

Cathode:

.....

.....



Anode:

Anode:

Cathode:

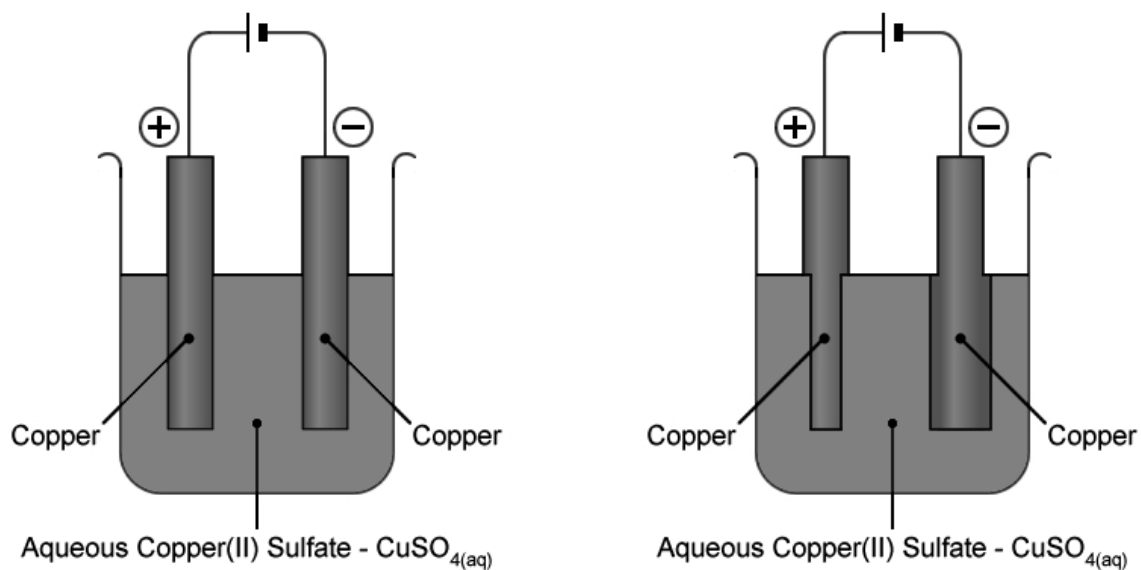
Cathode:

.....

.....

Question 16:

Explain how a block of impure copper can be purified by electrolysis.



.....

.....

.....

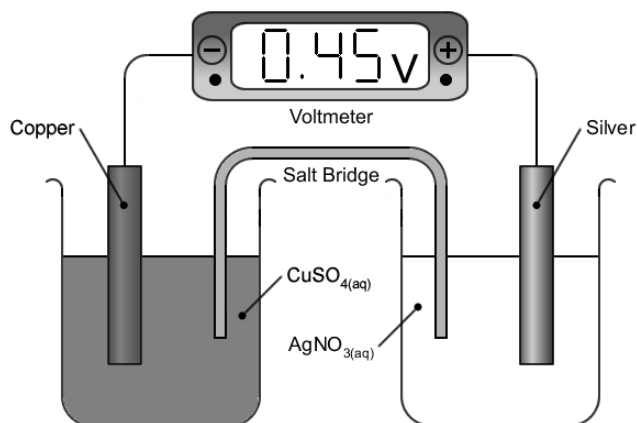
.....

Question 17:

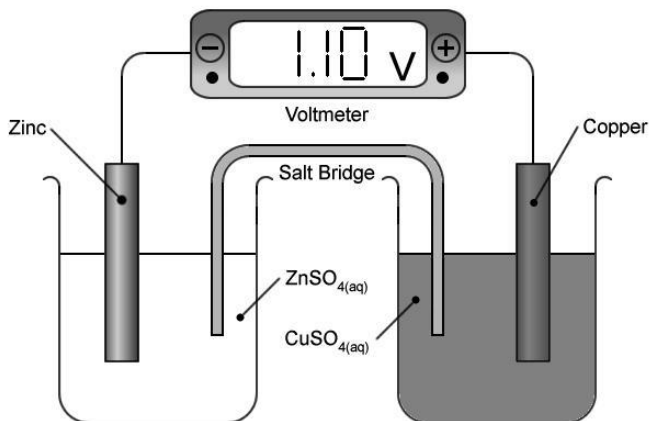
Sketch a labelled diagram that clearly illustrates how a metallic object (e.g. a knife, fork or spoon) can be coated with a thin layer of silver.

Question 18:

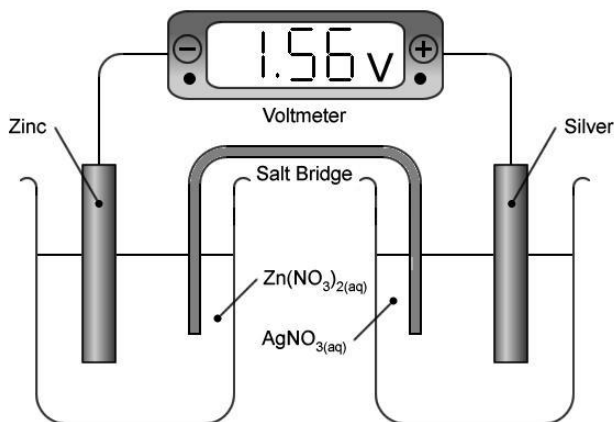
Describe what is happening in each one of the following electrochemical cells.



.....
.....
.....



.....
.....
.....



.....
.....
.....

- Scan the QR code given below to view the answers to this assignment.



http://www.chemist.sg/electro_chem/electrochem_worksheet_ans.pdf