

Effect of an electric current on substances

1. (a) $Pb^{2+}_{(l)} + 2e^- \rightarrow Pb_{(s)}$

(b) - There is liberation of brown vapour

- The brown vapour is due to the formation of bromine molecule

2. E – Giant ionic structure

F – Giant metallic structure

3. (a) - Electrolytes are melts or aqueous solutions which allow electric current to pass through them and are decomposed by it while non-electrolyte are melts or aqueous solution which do not conduct electric current

- Electrolytes contain mobile ions while non-electrolyte contains molecules.

(c) (i) I bulb did not light when sugar solution was put into the beaker

II bulb light when salt solution was put into the beaker

(ii) Non- electrolyte I

Electrolyte II

(b) (i) heating

(ii) Cathode

$Pb^{2+} + 2e^- \longrightarrow Pb_{(s)}$ grey deposit metal is observed

(iii) Anode

$2Br^-_{(aq)} \longrightarrow Br_{2(g)} + 2e^-$

A brown yellow gas is evolved

4. a) i) Decomposes to Pb^{2+} and ions which are later reduced to Pb and are oxidized to Br

ii) $Br_{2(g)}$ produced is poisonous

5. I (a) Crystallization – The solidifying of a salt from a saturated solution on cooling.

(b) Addition of sodium chloride to soap-glycerol mixture in order to precipitate the soap.

II– to the nitric acid in a beaker, add barium carbonate solid as you stir until effervescence stops.

- Filter to obtain the filtrate

- Add dilute nitric acid to the filtrate and filter to obtain the residue

- Dry the residue under the sun or between filter papers.

III (a) (i) K^+

(ii) NO_3^-

(b) $2KNO_{3(s)} \xrightarrow{\text{heat}} 2KNO_{2(s)} + O_{2(g)}$

(IV) $Cu^{2+}(NH_3)_4$

(V) In water HCl ionizes into mobile ions which conduct because water is polar while methyl is non-polar hence HCl does not ionize hence does not conduct electricity

6. (i) Faraday first law of electrolysis.

The mass of a substance dissolved or liberated in electrolysis is proportional to the quantity of electricity which passes through the electrolyte.

(ii) (anode) – Brown/fumes of a gas were evolved (cathode) – grey beads.

7. a) (i) Place dilute nitric acid (HNO_3) in a beaker and warm.

- Add lead II oxide until no more dissolves

- Filter the un reacted lead II oxide

- Heat to evaporate & leave to crystallize.

(ii) $PbO_s + 2HNO_{3aq} \longrightarrow Pb(NO_3)_{2aq} + H_2O_n$

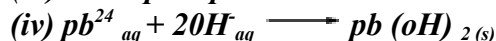
b)(i) Crystals crack and split because of the gas accumulating inside

- Brown gas of Nitrogen IV oxide.

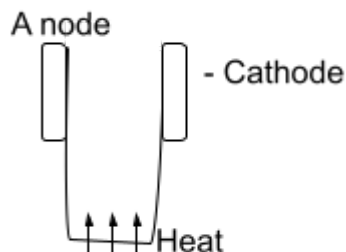
- Solid residue, lead II oxide which is orange when hot is yellow when cold.



c) (iii) white precipitate which is insoluble in excess ammonia



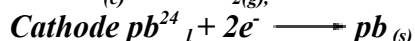
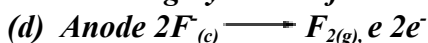
8. (a)



(b) To let the gas produce out, so that it does not explode due to pressure.

(c) At the anode a pale yellow gas is observed

Cathode – grey solid is formed.



(e) the gas produce is poisonous.

II a) C

b) Because it does not conduct electricity in solid state and not soluble.

c) B because it does not conduct electricity in solid state but in molten or aqueous solution it conducts.

d) Metallic bond.

9. a) A is Anode ✓

B is cathode. ✓

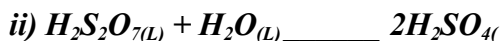
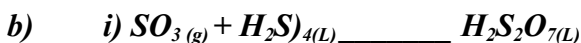
b) Bromine gas. ✓



10. B and D or F_2 and Ne

11. a) i) oil

ii) Water



12. a) Source of heat. 1

b) The solid PbBr_2 melts to form Pb^{2+} and 2Br^- that conduct electric current in the circuit hence the bulb lights/ Pb^{2+} and 2Br^- carry the current. 1