

## Effect of an electric current on substances

- (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
- E – Giant ionic structure

F – Giant metallic structure
- (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

$$Pb^{2+} + 2e^- \rightarrow Pb_{(s)}$$

grey deposit metal is observed

(iii) Anode

$$2Br_{(aq)}^- \rightarrow Br_{2(g)} + 2e^-$$

A brown yellow gas is evolved
- 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
- 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 into mobile ions which conduct because water is polar while methyl is non-polar hence HCl does not ionize hence does not conduct electricity
- (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.
- 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.

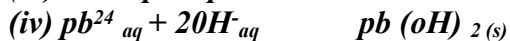
(ii)  $PbO_{(s)} + 2HNO_{3(aq)} \rightarrow Pb(NO_3)_{2(aq)} + H_2O_{(l)}$

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

- *Brown gas of Nitrogen IV oxide.*
- *Solid resolute, lead II oxide which is orange when hot is yellow when cold.*



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

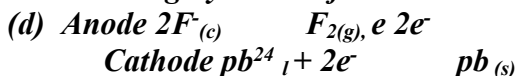


8. (a)

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

(e) *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 ✓*

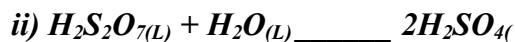
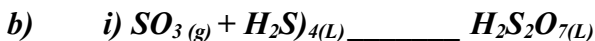
*B is cathode. ✓*

b) *Bromine gas. ✓*



10. *B and D or F<sub>2</sub> and Ne*

11. a) i) *oil*  
 ii) *Water*



12. a) *Source of heat. ✓1*

b) *The solid PbBr<sub>2</sub> melts to form Pb<sup>2+</sup> ✓½ and 2 Br<sup>-</sup> ✓½ that conduct electric current in the circuit hence the bulb lights/Pb<sup>2+</sup> and 2Br<sup>-</sup> carry the current. ✓1*