

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

(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
- (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 ( $\text{HNO}_3$ ) in a beaker and warm.*

- *Add lead II oxide until no more dissolves*

- *Filter the unreacted lead II oxide*

- *Heat to evaporate & leave to crystallize.*

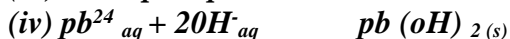
*(ii)  $\text{PbO}_s + 2\text{HNO}_{3aq} \rightarrow \text{Pb}(\text{NO}_3)_{2aq} + \text{H}_2\text{O}_n$*

*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 incolible is excess ammonia*

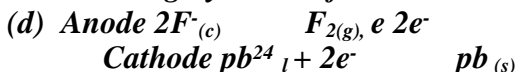


8. (a)

(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 conducts electricity in solid state but in molten or aqueous solution it conducts.*

d) *Metallic bond.*

9. a) *A is Anode* ✓<sup>l</sup>

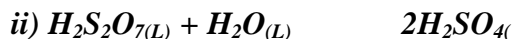
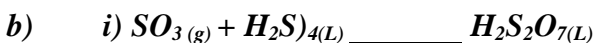
*B is cathode.* ✓<sup>l</sup>

b) *Bromine gas.* ✓<sup>l</sup>



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

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



12. a) Source of heat. **p1**  
b) The solid  $\text{PbBr}_2$  melts to form  $\text{Pb}^{2+}$  **p<sup>1/2</sup>** and  $2 \text{Br}$  **p<sup>1/2</sup>** that conduct electric current in the circuit hence the bulb lights/ $\text{Pb}^{2+}$  and  $2\text{Br}$  carry the current. **p1**