

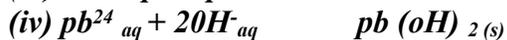
Effect of an electric current on substances

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
 $Pb^{2+} + 2e^{-} \rightarrow Pb_{(s)}$ grey deposit metal is observed
 (iii) Anode
 $2Br_{(aq)}^{-} \rightarrow Br_{2(g)} + 2e^{-}$
 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 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) $PbO_{(s)} + 2HNO_{3(aq)} \rightarrow Pb(NO_3)_{2(aq)} + H_2O_{(l)}$
 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*

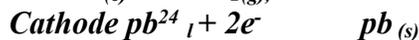
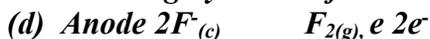


8. (a)

(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.*

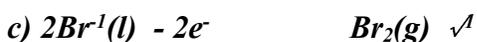
c) *B because it does not conduct electricity in solid state but in molten or aqueous solution it conducts.*

d) *Metallic bond.*

9. a) *A is Anode ✓*

B is cathode. ✓

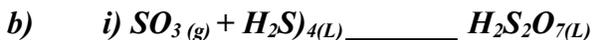
b) *Bromine gas. ✓*



10. *B and D or F₂ and Ne*

11. a) i) *oil*

ii) *Water*



12. a) *Source of heat. ✓1*

b) *The solid PbBr₂ melts to form Pb²⁺ ✓½ and 2 Br⁻ ✓½ that conduct electric current in the circuit hence the bulb lights/Pb²⁺ and 2Br⁻ carry the current. ✓1*