# Effect of an electric current on substances

*1. (a)* $Pb^{2+}_{(l)}$ *2e n* $Pb_{(s)}$

*(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 acqueous solutions which allow electric current to pass through them and are decomposed by it while non-electrolyte are melts or acqueous solution which do not conduct electric current*
*- Electrolytes contain mobrite 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 slat solution was put into the beaker*
*(ii) Non- electrolyte I*
*Electrolyte II*
*(b) (i) heating*
*(ii) Cathode*
$Pb^{24} + 2e^- \longrightarrow Pb_{(s)}$ *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 form 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 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 low of electrolysis.*
*The mass of a substance dissolved on 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 elilute 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 evapourae & leave to crystallize.*

*(ii)* $Pbo_s + 2HNO_{3aq} \longrightarrow pb(No_3)_{2\,aq} + H_2O_n$

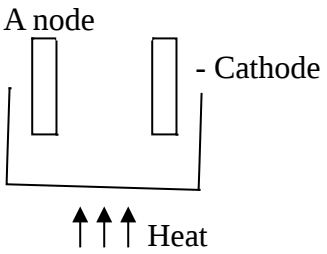
*b)(i) Crystals crack and split because of the gas accumulating inside*
- *Brown gas of Nitrogen IV oxide.*
- *Solid resolute, lead II oxide which is orange when hot is yellow when cold.*

*(ii)* $2\,pb(NO_3)_{2s}\ 2\,Pbo_s + o_{2(g)} + 4NO_{2(g)}$

*c) (iii) white precipitate which is incolible is excess ammonia*

*(iv)* $pb^{24}{}_{aq} + 20H^-{}_{aq} \longrightarrow pb\,(oH)_{\,2\,(s)}$

*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.*
*(d) Anode* $2F^-_{(c)} \longrightarrow F_{2(g),}\ e\ 2e^-$
*Cathode* $pb^{24}{}_l + 2e^- \longrightarrow pb_{(s)}$
*(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* √1
*B is cathode.* √1
*b) Bromine gas.* √1
*c)* $2Br^{-1}(l) - 2e^- \longrightarrow Br_2(g)$ √1

*10.* *B and D or* $F_2$ *and Ne*

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

*b)* *i)* $SO_{3\,(g)} + H_2S)_{4(L)} \_\_\_\_\_ H_2S_2O_{7(L)}$

*ii)* $H_2S_2O_{7(L)} + H_2O_{(L)} \_\_\_\_\_ 2H_2SO_{4(}$

*12.* *a) Source of heat. 1*
*b) The solid* $PbBr_2$ *melts to form* $Pb^{2+}$ ½ *and* $2\ Br^-$ ½ *that conduct electric current in the circuit hence the bulb lights/* $Pb^{2+}$ *and* $2Br^-$ *carry the current.* 1