NEATH PORT TALBOT COLLEGE
COLEG CASTELL NEDD PORT TALBOT

School of Maths & Science
Science Practical

Inorganic Plan 3

◆ Aim

Devise and execute a suitable plan to identify five solutions.

◆ Introduction

This task tests your knowledge of qualitative inorganic chemistry and your ability to use this information to devise a testing strategy to identify five solutions. You will be provided with the four solutions and their labels which have fallen off. Your task is to reattach the labels to the correct bottle. The first activity you will have to carry out is to device a suitable plan to enable to identify the solutions.

◆ Safety

Control Measures

- The wearing of safety glasses and a laboratory coat at all times will be sufficient to take account of most hazards and significant risks.
- Keep stoppers on bottles as much as is possible.
- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.

Hazards

Harmful/ Irritant Treat all solutions as potentially harmful solutions

◆ Procedure

You are provided with five solutions from which the labels have become detached. The five solutions are: **sodium hydroxide, sodium sulphate, zinc nitrate, potassium iodide and lead nitrate.** You are not allowed to use any other reagents other than the solutions themselves. Devise a suitable plan that will allow you to identify each solution. When your plan has been checked to may use it to identify the solutions.

◆ Questions

Write ionic equations for all positive outcomes.

◆ Plan

We will mix 1 cm^3 of each solution with 1 cm^3 of the remaining solutions and record the observations, in particular any precipitates and their colour. Beneath is a table which shows what we would expect to observe with each solution.

	NaOH	Na_2SO_4	$Pb(NO_3)_2$	KI	$Zn(NO_3)_2$
NaOH		No ppt	white ppt	No ppt	white ppt
Na_2SO_4	No ppt		white ppt	No ppt	No ppt
$Pb(NO_3)_2$	white ppt	white ppt		Yellow ppt	No ppt
KI	No ppt	No ppt	yellow ppt		No ppt
$Zn(NO_3)_2$	white ppt	No ppt	No ppt	No ppt	

With each solution we expect to make the following observations:

NaOH	2 white ppts,	2 No ppt	
Na_2SO_4	1 white ppt,	3 No ppt	
$Pb(NO_3)_2$	2 white ppts,	1 No ppt,	1 Yellow ppt
KI	1 Yellow ppts,	3 No ppt	
$Zn(NO_3)_2$	1 white ppts,	3 No ppt	

We can identify the solutions of **NaOH, $Pb(NO_3)_2$ and KI** from the unique combination of observations.

We now need to distinguish between the solutions of **Na_2SO_4 and $Zn(NO_3)_2$**. NaOH(aq) will give a white ppt with $Zn(NO_3)_2$ and no ppt with Na_2SO_4. We can hence distinquish the solutions by checking reaction with NaOH.