Applecross Senior High School

AECHE 2017

Chemistry Practical Test

Solutions

Time: 1.5 hours.

Marks: This test is worth a total of 20 marks.

Aim: To identify the seven unknown solutions.

Materials:

1. Acetate sheet with a grid.
2. Seven dropper bottles labelled **A** to **G** containing the following solutions in random order:

- ammonium sulfate
- potassium iodide
- lead nitrate
- barium nitrate
- potassium chromate
- sodium chloride
- silver nitrate

Procedure:

Plan and conduct an experiment to identify the seven unknown solutions.

Results:

Record your results on the table provided.

[5 marks]

Conclusion:

1. From your observations identify each of the unknown solutions. State the name of each solution.

[7 marks]

2. Give reason/s for your identification of each solution.

[5 marks]

3. Write **net ionic** equations for all reactions that were observed.

[3 marks]

Useful information

The following in formation may be used to help you identify the unknowns:

- All iodides are soluble except silver and lead, which both form yellow precipitates.
- All sodium and potassium compounds are soluble.
- All nitrate compounds are soluble.
- All chlorides compounds are soluble except silver and lead, which both form white precipitates.
- All sulfates compounds are soluble except barium and lead.
- All chromates are soluble except:
  - silver which forms a red precipitate;
  - lead which forms a bright yellow precipitate;
  - barium which forms a lime yellow precipitate.

GOOD LUCK!

Report

1. Use the following table to record your results:

	A	B	C	D	E	F	G
A		NR	NR	White ppt	Yellow ppt	White ppt	Bright Yellow ppt
B	NR		NR	NR	NR	White ppt	Lime Yellow ppt
C	NR	NR		White ppt	Yellow ppt	NR	Red ppt
D	White ppt	NR	White ppt		NR	NR	NR
E	Yellow ppt	NR	Yellow ppt	NR		NR	NR
F	White ppt	White ppt	NR	NR	NR		NR
G	Bright Yellow ppt	Lime Yellow ppt	Red ppt	NR	NR	NR	

[5 marks]

2. Identify the unknown solution below:

A = Lead nitrate $Pb(NO_3)_2$
B = Barium nitrate $Ba(NO_3)_2$
C = Silver nitrate $Ag(NO_3)_2$
D = Sodium chloride $NaCl$
E = Potassium iodide KI
F = Ammonium sulfate $(NH_4)_2SO_4$
G = Potassium chromate K_2CrO_4

[7 marks]

Predicted Results

	$(NH_4)_2SO_4$	KI	$Pb(NO_3)_2$	$Ba(NO_3)_2$	K_2CrO_4	NaCl	$AgNO_3$
$(NH_4)_2SO_4$		NR	$PbSO_4$	$BaSO_4$	NR	NR	NR
KI	NR		Yellow PbI_2	NR	NR	NR	Yellow AgI
$Pb(NO_3)_2$	$PbSO_4$	Yellow PbI_2		NR	Bright Yellow $PbCrO_4$	White $PbCl_2$	NR
$Ba(NO_3)_2$	$BaSO_4$	NR	NR		Lime Yellow $BaCrO_4$	NR	NR
K_2CrO_4	NR	NR	Bright Yellow $PbCrO_4$	Lime Yellow $BaCrO_4$		NR	Red Ag_2CrO_4
NaCl	NR	NR	White $PbCl_2$	NR	NR		White $AgCl$
$AgNO_3$	NR	Yellow AgI	NR	NR	Red Ag_2CrO_4	White $AgCl$	
Summary	2 ppt	2 ppt Both Yellow	4 ppt 2 Yellow	2 ppt 1 lime Yellow	3 ppt 2 Yellow 1 Red	2 ppt Both White	3 ppt Yellow Red White

3. Explain how you identified the unknown solutions. [5 marks]

A - $Pb(NO_3)_2$ had 4 ppt - 2 yellow - 2 white

B - $Ba(NO_3)_2$ had 2 ppt - 1 white - 1 lime yellow

C - $AgNO_3$ had 3 ppt - white, yellow and red

D - $NaCl$ had 2 ppt - both white - Reacted with Silver AgCl

E - KI had 2 ppt - both yellow

F - $(NH_4)_2SO_4$ had 2 ppt - both white

G - K_2CrO_4 had 3 ppt - white, bright yellow, red

4. Write net ionic equations for all reactions that you observed. [3 marks]

$Pb^{2+}_{(aq)} + 2Cl^-_{(aq)} \rightarrow PbCl_{2(s)}$

$Pb^{2+}_{(aq)} + 2I^-_{(aq)} \rightarrow PbI_{2(s)}$

$Pb^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)} \rightarrow PbSO_{4(s)}$

$Pb^{2+}_{(aq)} + CrO_4^{2-}{}_{(aq)} \rightarrow PbCrO_{4(s)}$

$Ba^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)} \rightarrow BaSO_{4(s)}$

$Ba^{2+}_{(aq)} + CrO_4^{2-} \rightarrow BaCrO_{4(s)}$

$Ag^+_{(aq)} + I^-_{(aq)} \rightarrow AgI_{(s)}$

$Ag^+_{(aq)} + Cl^-_{(aq)} \rightarrow AgCl_{(s)}$

$2Ag^+_{(aq)} + CrO_4^{2-}{}_{(aq)} \rightarrow Ag_2CrO_{4(s)}$