

CHEMISTRY 235 EXPERIMENT 4

QUALITATIVE ANALYSIS

METHOD AND RESULTS

The compounds A, B, and C contain three of the ions Co^{2+} , Mn^{2+} , Cr^{3+} , and Ni^{2+} . Identify the ion present in each compound. Write the equation, where relevant, for each reaction in the deduction column. Instead of $\text{H}_2\text{S}(\text{aq})$, a solution in propanone (acetone), $\text{H}_2\text{S}(\text{C}_3\text{H}_6\text{O})$, may be provided.

COMPOUND A

TESTS	OBSERVATIONS	DEDUCTIONS
Make an aqueous soln. of A and use it for the following tests. Use a fresh portion for each test unless otherwise instructed.		
a) Add $\text{NaOH}(\text{aq})$ until in excess. Divide the result into 2 parts. i) Boil 1 part. ii) Add $\text{H}_2\text{O}_2(\text{aq})$ to 2nd part. iii) Add some ethyl ethanoate or ether to the result from (ii), then a few drops of dil. HCl and shake gently.		
b) Add $\text{NH}_3(\text{aq})$ until in excess. Boil the result.		
c) Add $\text{Na}_2\text{CO}_3(\text{aq})$		
d) Add $\text{H}_2\text{S}(\text{aq})$		
e) Add $\text{K}_4\text{Fe}(\text{CN})_6$		

COMPOUND B

TESTS	OBSERVATIONS	DEDUCTIONS
Make an aqueous soln. of B for the following tests. Use a fresh portion for each test unless otherwise instructed.		
a) Add NaOH(aq) until in excess. Add H ₂ O ₂ (aq) to the result and boil.		
b) Add NH ₃ (aq) until in excess.		
c) Add NH ₄ Cl(s) followed by NH ₃ (aq).		
d) Add H ₂ S(aq). Divide into two parts. i) Add dil. HCl to 1 part. ii) Add conc. HNO ₃ to 2nd part.		
e) Add K ₃ Fe(CN) ₆ (aq)		
f) Add K ₄ Fe(CN) ₆ (aq)		
g) Add butanedione dioxime(aq) ¹		

¹ Dimethylglyoxime solution

COMPOUND C

TESTS	OBSERVATIONS	DEDUCTIONS
Make an aqueous soln. of C and use it for the following tests. Use a fresh portion for each test unless otherwise instructed.		
a) Add NaOH(aq) until in excess. Add 1 or 2 drops of H ₂ O ₂ (aq) to the result.		
b) Add NH ₃ (aq) until in excess. Now redo the test but 1st add NH ₄ Cl(s)		
c) Add H ₂ S(aq) followed by dil. HCl.		
d) Add a few drops conc. HNO ₃ or conc. H ₂ SO ₄ followed by NaBiO ₃ (s). Stir, filter and note the colour of the soln.		
e) Add a few drops of conc. HNO ₃ then some PbO ₂ (s). Boil, filter.		
f) Add Na ₂ S ₂ O ₈ (aq) followed by dil. HNO ₃ then 2 drops of AgNO ₃ . Boil the result.		