/21

Solutions

Name - _____

Partner - _____

Purpose – to investigate the formation of solutions and some of their properties.

Materials -

1.) Calcium carbonate	2.) copper nitrate	3.) glycerine
4.) Oleic acid	5.) sodium hydroxide (s)	6.) ammonium chloride
7.) sodium chloride	8.) methyl alcohol	9.) iodine crystals
10.) $thermometer \times 6$	11.) $medium\ test\ tubes \times 22$	12.) filter paper
13.) filter	14.) Erlenmeyer for filter collection	15.) eye dropper
17.) measuring spoons	18.) $test\ tube\ stopper \times 8$	19.) glass slides
20.) hot plates		

Procedure – follow instructions carefully making **detailed** observations in data and observations.

Part 1 –

1.) Add a small scoop of calcium carbonate to a test tube half-filled with distilled water. Stopper and shake for several minutes.

2.) Filter the resulting liquid.

3.) Place several drops of the filtrate (the liquid that you poured through the filter) on a clean glass slide and place it on a hot plate until all liquid has evaporated.

Part 2 –

1.) Add a small scoop of copper nitrate to a test tube half-filled with distilled water. Stopper and shake for several minutes.

2.) Filter the resulting liquid.

3.) Place several drops of the filtrate on a clean glass slide and place it on a hot plate until all liquid has evaporated.

Part 3 – Half fill an eyedropper with glycerine and add it to a test tube half-filled with distilled water. Stopper and shake for several minutes.

Part 4 – Half fill an eyedropper with oleic acid and add it to a test tube half-filled with distilled water. Stopper and shake for several minutes.

Part 5 –

1.) Add enough distilled water to a test tube to make it $\frac{1}{4}$ full and then measure the temperature.

2.) Add a small scoop of sodium hydroxide* and stir gently with the thermometer.

* means CORROSIVE!

/21

3.) Record the final temperature.

Part 6 –

1.) Add enough distilled water to a test tube to make it ¼ full and then measure the temperature.

2.) Add a small scoop of ammonium chloride and stir gently with the thermometer.

3.) Record the final temperature.

Part 7 –

1.) Add enough distilled water to a test tube to make it ¼ full and then measure the temperature.

2.) Add a small scoop of calcium carbonate and stir gently with the thermometer.

3.) Record the final temperature.

Part 8 – Add a small scoop of sodium chloride to a test tube half filled with distilled water. Stopper and shake for several minutes.

Part 9 – Add a small scoop of sodium chloride to a test tube half filled with methanol. Stopper and shake for several minutes.

Part 10 – Add several crystals of iodine* to a test tube half filled with distilled water. Stopper and shake for several minutes. *CORROSIVE!!!

Part 11 – Add several crystals of iodine* to a test tube half filled with methanol. Stopper and shake for several minutes. *CORROSIVE!!

/21

Data and Observations – (7)

	Observations
Part 1	1.)
	2.)
	3.)
Part 2	1.)
	2.)
	3.)
Part 3	
Part 4	
Part 5	
Part 6	
Part 7	
Part 8	
Part 9	

/21

Part 10	
Part 11	

Post Lab Questions – (4)

1.) The calcium carbonate used in procedure part 1 did not form a solution but rather was suspended in the water. The copper (II) nitrate and water did form a solution. Use the following terms and descriptions to write a paragraph explaining the differences between a solution and a suspension.

- Clear
- Cloudy
- Particles never settle out
- Particles settle out eventually
- Filtrate leaves a residue after evaporation
- Particles are too large to pass through filter paper
- Particles are small enough to pass through filter paper

/21

2a.) The terms 'miscible' and 'immiscible' may be used to describe the results of having mixed two liquids together (see text page 505). Use these terms and the observations from procedure part 3 and 4 to show that you understand their meanings. (2)

b.) When two liquids are completely soluble in each other, how do you determine which is the solute and which is the solvent? (1)

3a.) Two main processes are involved in the formation of a solution between an ionic solid and water. The breaking apart of the ions of the solid is an endothermic process. Relatively strong bonds between the ions require a relatively large amount of energy for this "breaking apart" to occur. The surrounding of the individual ions by water molecules (dissolving) is an exothermic process. With this information and the results of procedure parts 5, 6 and 7, say whether the bonds holding sodium hydroxide are weaker or stronger than the bonds holding ammonium chloride together. Explain your reasoning. (2)

b.) Why was there little exchange of energy when calcium carbonate was mixed with water? (1)

4a.) Give an example of a procedure in this lab that shows why the statement 'sodium chloride is soluble' may be misleading. Explain. (2)

b.) Give an example of a procedure form this lab that shows why the statement 'iodine is not soluble' may be misleading. Explain. (2)