

**POST Lab QUIZ Identification of unknowns Investigation** ( /23 marks)

During this investigation you were given two sets of different chemical substances to identify.

In Set 1 you were provided with aqueous solutions of  $\text{BaCl}_2$ ,  $\text{CuSO}_4$ ,  $\text{H}_2\text{SO}_4$  and  $\text{NaCl}$ .

1. How did you identify the  $\text{CuSO}_4$ ? (1 mark)

2. At one point you would have produced a white precipitate from two colourless solutions.

i. Name the two solutions that were combined. (2 marks)

\_\_\_\_\_ and \_\_\_\_\_

ii. Name the precipitate formed. (1 mark)

\_\_\_\_\_

iii. Write a 'net ionic equation' to represent this precipitation.  
You may do this in a number of steps. (3 marks)

3. At another point you would have combined two colourless solutions and produced no precipitate.  
That is, there was no reaction.

i. Name the two solutions that were combined. (2 marks)

\_\_\_\_\_ and \_\_\_\_\_

ii. In the space below sketch a diagram to show all the chemical species that are present in a beaker containing these two combined solutions. (2 marks)

4. In the space below sketch a diagram to show how the water molecules are likely to be arranged about a Sodium ion in aqueous solution. (2 marks)



In Set 2 you were provided with aqueous solutions of  $\text{BaCl}_2$ ,  $\text{AgNO}_3$ ,  $\text{ZnSO}_4$  and  $\text{NaI}$ .

5. At one point you produced a pale yellow precipitate.

i. Name the two solutions that were combined. (2 marks)

\_\_\_\_\_ and \_\_\_\_\_

ii. Name the precipitate formed. (1 mark)

\_\_\_\_\_

iii. Write a 'net ionic equation' to represent this precipitation.  
You may do this in a number of steps. (3 marks)

6. During the last step in your planning you may have had to assume you could tell the difference between the **Insoluble** silver chloride and the **Sparingly Soluble** silver sulphate.

Two students carrying out this Investigation **could not** tell them apart and decided to do a further test using a chemical that was **not** from the Set of chemicals provided.

Choose an appropriate aqueous solution that they could use to tell the colourless aqueous  $\text{ZnSO}_4$  solution apart from the colourless aqueous  $\text{BaCl}_2$  solution.

i. They could use \_\_\_\_\_ (1 mark)

ii. Describe how the solutions would react differently. To support your answer, use net ionic equations for any reactions that take place. (3 marks)