**Practical application questions**

**Determination of the composition of copper (II) carbonate.**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | Describe how to set up the apparatus to measure the volume of gas produced in a reaction? |  |
| 2 | How can the number of moles of CO2 be calculated from the volume of CO2 collected during an experiment? |  |
| 3 | What is used to accurately measure mass? |  |
| 4 | CuCO3 reacts with HCl to produce 15 moles of CO2. How many moles of CuCO3 reacted?  |  |
| 5 | How could you find the percentage mass of CuCO3 in CuCO3.Cu(OH)2? |  |
| 6 | Why is it important to rapidly put the bung into the conical flask after adding sulfuric acid to CuCO3.Cu(OH)2? |  |
| 7 | Give 3 possible sources of error when investigating the volume of gas produced in a reaction.  |  |
| 8 | What safety precautions should be taken when conducting an experiment with CuCO3.Cu(OH)2 and sulfuric acid?  |  |

**Determination of the relative atomic mass of magnesium**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | Describe how the set up the apparatus to measure the volume of gas produced in a reaction? |  |
| 2 | What is used to accurately measure mass? |  |
| 3 | Write the chemical equation for the reaction that occurs when magnesium reacts with sulfuric acid? |  |
| 4 | How can measuring the volume of gas produced during the reaction between magnesium and sulfuric acid be used to determine the relative atomic mass of magnesium?  |  |
| 5 | Give 2 possible sources of error in this experiment? |  |
| 6 | Why is it important to rapidly put the bung in the conical flask after adding the sulfuric acid? |  |
| 7 | What equation links moles, molecular mass and mass? |  |
| 8 | What safety precautions should be taken when conducting an experiment with magnesium and sulfuric acid? |  |

**Acid Base Titration**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | What apparatus is used in a titration to accurately measure volumes? |  |
| 2 | Describe the ‘weighing-by-difference’ methods? |  |
| 3 | Describe how to carry out an acid-base titration? |  |
| 4 | When transferring a solution from one beaker to another, how can you ensure as much of the dissolved substance has been transferred as possible? |  |
| 5 | How do you accurately fill a volumetric flask to the graduated mark? |  |
| 6 | What is a standard solution? |  |
| 7 | Describe how to make a standard solution of NaHCO3? |  |
| 8 | Suggest 2 indicators that could be used in an acid-base titration? |  |
| 9 | State the colour of phenolphthalein in A) Acid base conditions B) Basic conditions. |  |
| 10 | State the colour of methyl orange in A) Acid conditions B) Basic conditions?  |  |
| 11 | What are concordant results in a titration? |  |
| 12 | What degree of precision should burette readings be recorded to? |  |
| 13 | Which results are used when calculating a mean titre? |  |
| 14 | When completing a titration, what piece of apparatus is used to make the colour change easier to observe? |  |
| 15 | What 3 things are required to take an accurate burette reading? |  |
| 16 | What is the end point of a titration? |  |
| 17 | Why is the conical flask swirled during a titration? |  |
| 18 | Why is it better to have a titre volume of 25cm3 than 10cm3? |  |
| 19 | What equation links number of moles and concentration? |  |
| 20 | If you know the volumes of acid required to neutralize an alkali, how could you calculate the concentration of the acid, given the alkali concentration and volumes? |  |

**Enthalpy Determination**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | What is calorimetry? |  |
| 2 | What type of reaction releases energy to the surroundings? |  |
| 3 | What type of reaction takes in energy from the surroundings? |  |
| 4 | What is a neutralisation reaction? |  |
| 5 | What is meant by the term standard enthalpy change of neutralisation?  |  |
| 6 | Write the word and chemical equations for the neutralisation reaction between sodium hydroxide and hydrochloric acid? |  |
| 7 | The enthalpy change of neutralisation reaction is being investigated. Why might this reaction be carried out in a styrofoam cup?  |  |
| 8 | What equation is used to calculate the energy absorbed by the solution? |  |
| 9 | How is the enthalpy change of neutralisation calculated from Q, the energy absorbed by the solution? |  |
| 10 | How can you find the maximum temperature reached during a neutralisation reaction? |  |
| 11 | Suggest 3 possible sources of error when investigating the enthalpy change of neutralisation. How could these errors be reduced? |  |
| 12 | Describe an experiment to investigate the enthalpy change of neutralisation of a reaction between hydrochloric acid and sodium hydroxide? |  |

**Qualitative analysis of ions**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | Describe the chemical test for halide ions? |  |
| 2 | How can SO42- ions be identified? |  |
| 3 | Describe the chemical test used to detect CO32- and HCO3- ions? |  |
| 4 | What ae the solubilities of the first 3 group 2 metals (Mg, Sr, Ba) in sulfate solutions? |  |
| 5 | What are the solubilities of the first 3 group 2 metals (Mg, Sr, Ba) in chromate solution? |  |

**Synthesis of an organic liquid Synthesis of a haloalkane**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | What type of reaction occurs when a haloalkane is formed from an alcohol? |  |
| 2 | Write chemical equations for the formation of 2-chloro-2-methylpropane from 2-methylpropan-2-ol. Then show the curly arrow mechanism.  |  |
| 3 | What are the 3 main stages in the synthesis of a haloalkane from an alcohol? |  |
| 4 | Why do 2 layers form in the separating funnel when synthesising a haloalkane from an alcohol? |  |
| 5 | What is the purpose of anti-bumping granules? |  |
| 6 | When producing a haloalkane from an alcohol, why is sodium hydrogen carbonate added to the organic layer after is has been separated from the aqueous layer? |  |
| 7 | Why is it important to open the stopper of the separating funnel regularly? |  |
| 8 | When producing a haloalkane from an alcohol, why is anhydrous sodium sulfate added to the organic mixture after separation? |  |
| 9 | Why is distillation used when synthesising a haloalkane from an alcohol? |  |
| 10 | Describe the key features of the apparatus set-up for distillation? |  |
| 11 | Why might a water bath or electric heater be used instead of a Bunsen burner to heat a reaction mixture? |  |
| 12 | What safety precautions should be taken when carrying out this practical? |  |

**Synthesis of an organic liquid – Preparation of cyclohexane**

|  |  |  |
| --- | --- | --- |
|  | Question | Answer  |
| 1 | Write the word and chemical equations for the reaction that takes place when cyclohexanol is dehydrated? |  |
| 2 | What is the role of phosphoric acid in the dehydration of alcohols? |  |
| 3 | When an alcohol is dehydrated, why do 2 layers form in the separation funnel? |  |
| 4 | Why is it important to open the stopper of the separating funnel regularly? |  |
| 5 | Cyclohexene can be produced from cyclohexanol. Why is sodium chloride added to mixture before it s separated with a separating funnel? |  |
| 6 | Cyclohexene can be produced from cyclohexanol. Why is anhydrous calcium chloride added to the crude product? |  |
| 7 | When cyclohexene is produced from cyclohexanol, is reflux or distillation apparatus used? |  |
| 8 | In the purification of the crude cyclohexene, is reflux or distillation apparatus used? |  |
| 9 | What is the purpose of anti-bumping granules? |  |
| 10 | Describe the key features of the apparatus set-up for distillation? |  |
| 11 | How can percentage yield be calculated? |  |
| 12 | Describe the chemical test for an alkene? |  |
| 13 | Why might a water bath or electric heater be used instead of a Bunsen burner to heat a reaction mixture? |  |
| 14 | What safety precautions should be taken when carrying out this practical? |  |