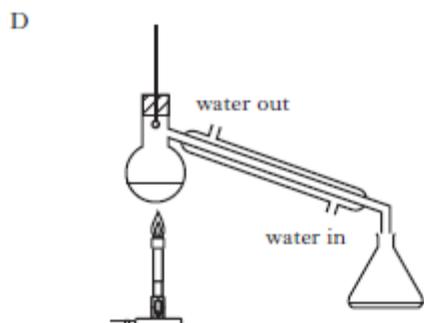
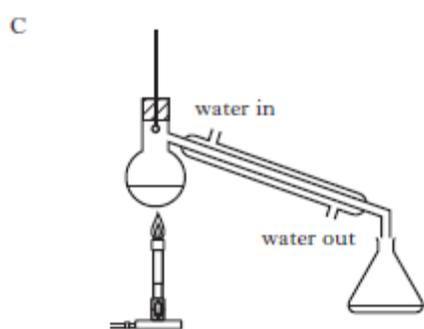
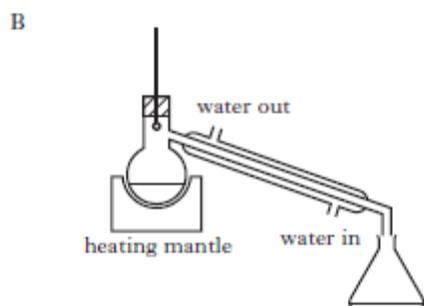
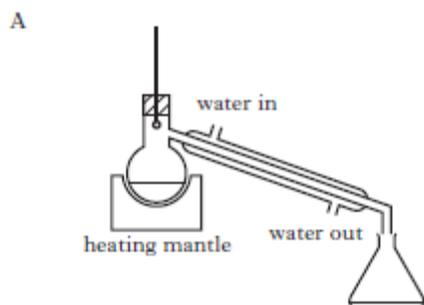


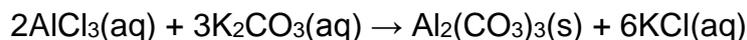
Unit 4: Researching Chemistry – Worksheet

Please attempt the following questions in preparation for the online session.

1. Which of the following diagrams shows the correct set up for the separation of ethanol from ethanoic acid?



2. Aluminium carbonate can be produced by the following reaction.



The most suitable method for obtaining a sample of the aluminium carbonate is

- A. collection over water
- B. distillation
- C. evaporation
- D. filtration.

(1)

3. Which of the following would **not** help a student determine the end point of a titration accurately?

- A. Swirling the flask.
- B. Using a white tile.
- C. Adding the solution dropwise near the end point.
- D. Repeating the titration.

(1)

4. The correct method of filling a 20 cm³ pipette is to draw the liquid into the pipette

- A. to above the mark and then release liquid from the pipette until the bottom of the meniscus touches the mark.
- B. doing it slowly at the end, until the bottom of the meniscus touches the mark
- C. to above the mark and then release liquid from the pipette until the top of the meniscus touches the mark
- D. doing it slowly at the end, until the top of the meniscus touches the mark

(1)

5. A 0.10 mol l⁻¹ solution could be prepared most accurately from a 1.0 mol l⁻¹ solution using

- A. a 1 cm³ dropping pipette and a 10 cm³ measuring cylinder
- B. a 10 cm³ measuring cylinder and a 100 cm³ volumetric flask
- C. a 25 cm³ pipette and a 250 cm³ volumetric flask
- D. a 50 cm³ burette and a 500 cm³ measuring cylinder

(1)

6. The vitamin C content of a carton of orange juice was determined by four students.

Each student carried out the experiment three times.

	Experiment 1 (mg/cm ³)	Experiment 2 (mg/cm ³)	Experiment 3 (mg/cm ³)
Student A	30.0	29.0	28.0
Student B	26.4	26.6	26.8
Student C	26.9	27.0	26.9
Student D	26.9	26.5	26.9

The most reproducible results were obtained by

- A. Student A
- B. Student B
- C. Student C
- D. Student D.

(1)

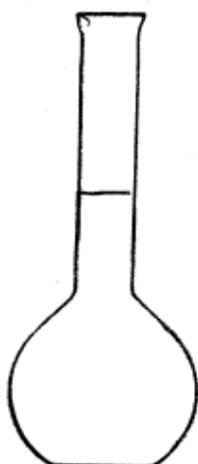
7. Solutions of barium chloride and silver nitrate are mixed together.

The reaction that takes place is an example of

- A. displacement
- B. neutralisation
- C. oxidation
- D. precipitation.

(1)

8. What piece of apparatus does the following diagram represent?



- A. Volumetric Flask
- B. Evaporating Dish
- C. Delivery Tube
- D. Conical Flask

(1)

9. Which technique is the most suitable for separating a mixture of miscible liquids?

- A. titration
- B. distillation
- C. filtration
- D. evaporation.

(1)

10. Which technique is the most suitable for heating a flammable liquid to 120°C?

- A. heating mantle
- B. water bath
- C. bunsen burner
- D. you should not heat flammable liquids.

(1)

11. Zinc is an essential element for the body and is found in a variety of foods.

The mass of zinc in four 100 g samples taken from a cheese spread was measured.

Sample	Mass of Zn (mg)
1	30.0
2	26.4
3	26.9
4	26.9

(a) Calculate the average mass of Zn, in mg, in 100 g of this cheese spread.

(1)

(b) The recommended daily allowance of zinc is 9.5 mg for an adult male.

100 g of peanuts contains 3.3 mg of zinc.

Calculate the mass of peanuts which would provide the recommended daily allowance of zinc.

(1)

12. Hydrogen sulfide, H₂S, can cause an unpleasant smell in water supplies.

The concentration of hydrogen sulfide can be measured by titrating with a chlorine standard solution.

50.0 cm³ samples of water were titrated using a 0.010 mol l⁻¹ chlorine solution.

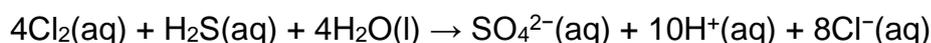
(a) Name an appropriate piece of apparatus which could be used to measure out the water samples.

(1)

(b) What is meant by the term standard solution?

(1)

The equation for the reaction taking place is



(c) An average of 29.4 cm³ of 0.010 mol l⁻¹ chlorine solution was required to react completely with a 50.0 cm³ sample of water.

Calculate the hydrogen sulfide concentration, in mol l⁻¹, present in the water sample.

Show your working clearly.

(3)

13. Potatoes contain a protein that acts as a catalyst in the breakdown of hydrogen peroxide.



A student wanted to measure the volume of oxygen gas given off, over a five minute period, when samples of potato were added to a solution of hydrogen peroxide.

(a) Draw a diagram to show how the volume of oxygen gas given off could be measured.

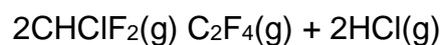
(1)

The student wanted to be able to repeat the experiment at various temperatures between 20°C and 70°C to investigate the effect of temperature on the protein catalysing the reaction.

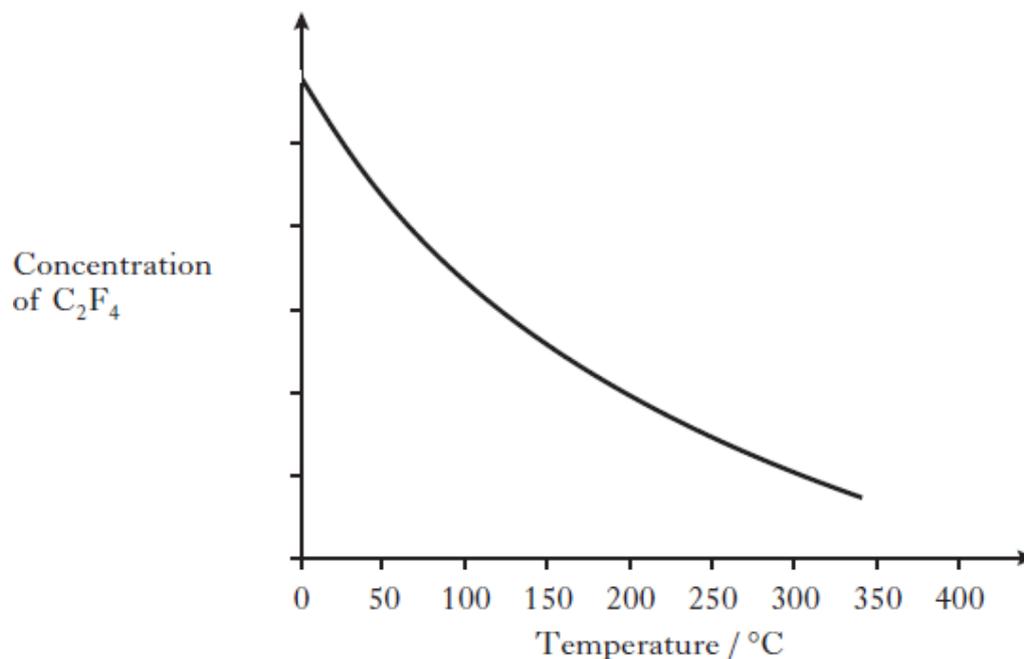
(b) What is the most appropriate way of heating the side-arm test tube to control the temperature accurately over this range?

(1)

14. Tetrafluoroethene, C_2F_4 , is produced in industry by the reaction shown below.



The graph shows the variation in concentration of C_2F_4 formed as temperature is increased.



What conclusion can be drawn about the enthalpy change for the formation of tetrafluoroethene?

(1)

Total marks = 20