

**MONDAY, 8 JANUARY –  
FRIDAY, 9 FEBRUARY 2024**

**APPLIED SCIENCE  
(Double Award) – Unit 4 (3445U50)**

**PRACTICAL ASSESSMENT**

**INVESTIGATING THE VITAMIN C  
CONTENT OF FRUIT JUICES**

**SECTION A**

**1 hour, plus your additional time allowance**

**Surname** \_\_\_\_\_

**First name(s)** \_\_\_\_\_

**Centre Number** \_\_\_\_\_

**Candidate Number**   0   \_\_\_\_\_



## **ADDITIONAL MATERIALS**

**A calculator.**

## **INSTRUCTIONS TO CANDIDATES**

**Use black ink, black ball-point pen or your usual method.**

**Write your name, centre number and candidate number in the spaces provided on the front cover.**

**Answer ALL questions.**

**Write your answers in the spaces provided in this booklet. If you run out of space, use the additional pages at the back of the booklet, taking care to number the question(s) correctly.**



**INFORMATION FOR CANDIDATES**

**The total number of marks available for this section of the task is 6.**

**The number of marks is given in brackets at the end of each question or part-question.**

**This task is in 2 sections, A and B. You will complete Section A in one lesson and Section B in the next science lesson.**

**(Turn over)**

<b>For Examiner's use only</b>		
	<b>Maximum Mark</b>	<b>Mark Awarded</b>
<b>Section A</b>	<b>6</b>	

## **Introduction**

**Your task is to investigate the vitamin C content of fruit juices.**

**You will measure the vitamin C content of different fruit juices by investigating how much of the juice is required to decolourise a solution of DCPIP.**

**Vitamin C reacts with DCPIP, changing the colour from blue to colourless.**

**(Turn over)**



## **Apparatus Required**

**The following apparatus is required for each group: (each group should consist of no more than three candidates).**

**eye protection**

**9 × test tube**

**1 × test tube rack**

**3 × dropping pipette**

**1 × 1 cm<sup>3</sup> syringe**

**Approx. 50 cm<sup>3</sup> of three different fruit juices labelled as orange, pineapple and grapefruit**

**12 cm<sup>3</sup> of 0.01% DCPIP solution**

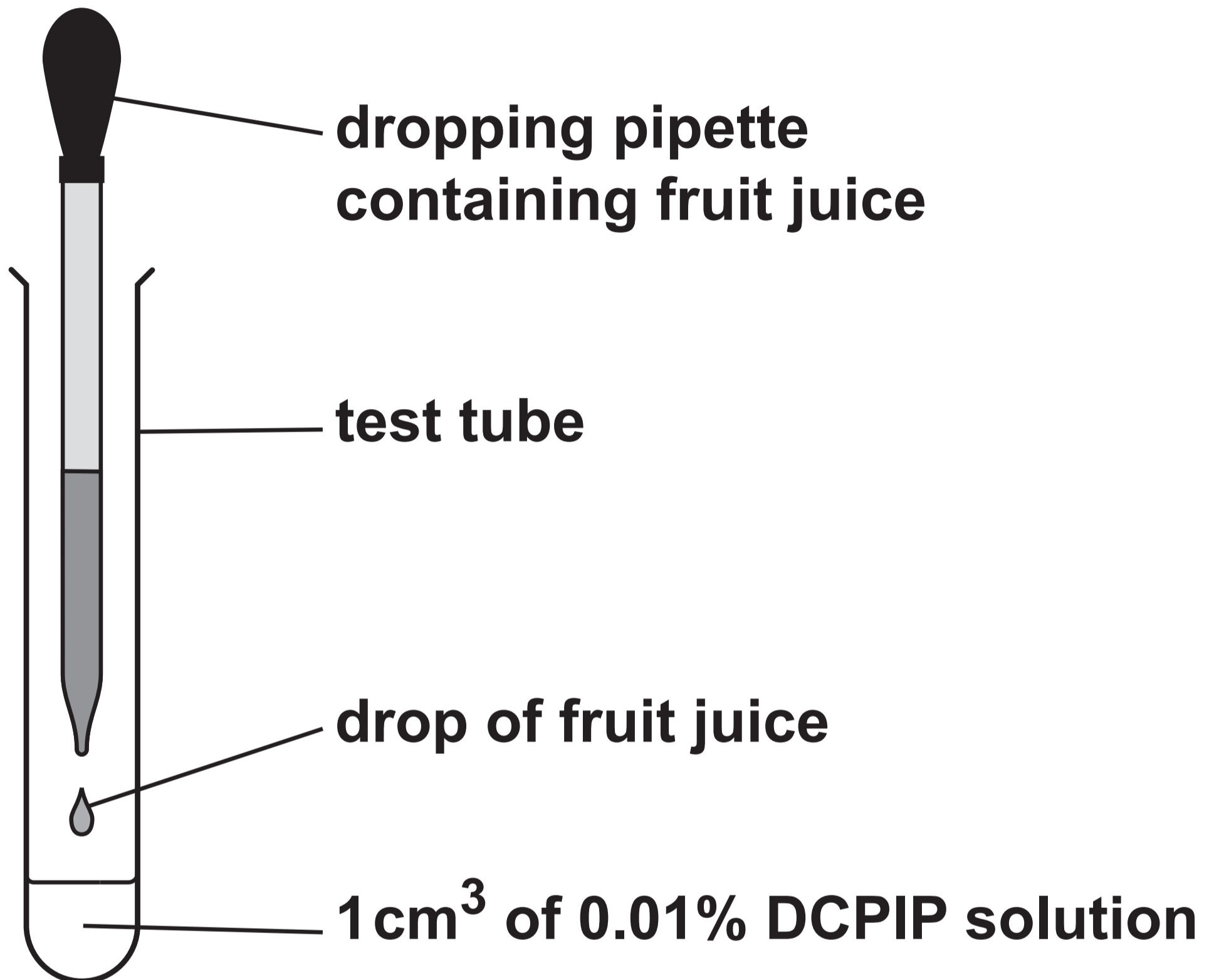
**CLEAPSS student safety sheet:**

**5 – Food testing (2). This is provided on pages 11–17 of this examination paper.**

**(Turn over)**



## Diagram



**READ THE METHOD AND ANSWER  
QUESTIONS 1.(a) AND 1.(b) BEFORE  
CARRYING OUT THE EXPERIMENT AND  
RECORDING YOUR RESULTS.**

**(Turn over)**



## **Method**

- 1. Wear eye protection.**
- 2. Place 1 cm<sup>3</sup> of the 0.01% DCPIP solution into a test tube using the syringe.**
- 3. Add orange juice one drop at a time using the dropping pipette. Ensure that the juice enters the DCPIP and does not run down the side of the tube.**
- 4. Swirl the tube gently after adding each drop.**
- 5. Record how many drops of juice are needed to make the blue colour of the DCPIP disappear (decolourise the DCPIP).**
- 6. Repeat steps 1–5 two more times to get three results in total.**
- 7. Repeat steps 1–6 for the other fruit juices.**

**(Turn over)**



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**TURN OVER**

<b>HAZARD</b>	<b>RISK</b>	<b>CONTROL MEASURE</b>

# SECTION A

**Answer ALL questions.**

- 1 (a) Complete the risk assessment on the opposite page for this experiment.  
[1 mark]**

**You may use the student safety sheet on pages 11–17 of this examination paper.**

**(Turn over)**



**1 (b) State why it is important that we have enough vitamin C in our diet. [1 mark]**

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**YOU MAY RECORD RAW RESULTS IN THE SPACE BELOW.**

**(Turn over)**



**1 (c) Present your results in a table.  
Include all of your results. [4 marks]**

<b>6</b>

**END OF PAPER**



**CLEAPSS**

**Student safety sheets**

**5**

**Food testing (2)**

**Key:**


**CORR. = CORROSIVE**

**FLAMM. = FLAMMABLE**

**ENVIR. = ENVIRONMENT**

**(Turn over)**



<b>Substance</b>	<b>Sakaguchi test</b> Used to test for proteins
<b>Hazard</b>	 <p><b>CORR.      HIGHLY FLAMM.      ENVIR.</b></p>
<b>Comment</b>	<p>The test involves mixing three solutions: sodium hydroxide (<math>\sim 1.3 \text{ mol/dm}^3</math>), naphthalen-1-ol in ethanol (<math>\sim 0.07 \text{ mol/dm}^3</math>) and sodium chlorate(I) (hypochlorite) (<math>\sim 1.5 \text{ mol/dm}^3</math>).</p> <p>Despite these hazards, it is safer to use than either form of Millon's reagent because it does not need to be heated and only a few drops are required. The biuret test is safer still.</p> <p><b>DANGER: Corrosive to skin and eyes, highly flammable.</b></p>

(Turn over)



<b>Substance</b>	<b>DCPIP</b> Used to test for Vitamin C
<b>Hazard</b>	Currently not classified as hazardous
<b>Comment</b>	

<b>Substance</b>	<b>Saliva</b> Used to break down starch
<b>Hazard</b>	Currently not classified as hazardous
<b>Comment</b>	Negligible risk.

<b>Substance</b>	<b>Clinistix</b> Used to test for glucose
<b>Hazard</b>	Currently not classified as hazardous
<b>Comment</b>	The tip of the stick contains a minute amount of a known carcinogen and should not be touched. The sticks should be stored and disposed of safely. It is normally used for testing urine.

(Turn over)



<b>Substance</b>	<b>Albustix</b> Used to test for proteins
<b>Hazard</b>	Currently not classified as hazardous
<b>Comment</b>	This will not detect all proteins. It is normally used for testing urine.

## **Typical control measures to reduce risk**

- **Wear eye protection and use the smallest possible amounts of chemicals.**
- **Use the least-hazardous substance that achieves the required effect.**

**(Turn over)**



## **Assessing the risks**

- **What are the details of the activity to be undertaken? What are the hazards?**
- **What is the chance of something going wrong?  
e.g. Could chemicals spit out of a heated test tube?**
- **How serious would it be if something did go wrong?  
e.g. Could ethanol (in the Sakaguchi test) catch fire, or acid splash into the eye?**
- **How can the risk(s) be controlled for this activity?  
e.g. Can it be done safely? Does the procedure need to be altered? Should goggles or safety spectacles be worn?**

**(Turn over)**



## **Emergency action**

**In all emergency situations, alert the responsible adult immediately. Be aware that actions may include the following:**

- **IN THE EYE**  
**Irrigate the eye with gently running tap water for at least 20 minutes. Call 999/111.**
- **IN THE MOUTH/SWALLOWED**  
**Do no more than rinse and spit with drinking water. Do NOT induce vomiting. Call 999/111.**
- **SPILT ON SKIN OR CLOTHING**  
**Remove contaminated clothing. Then drench the skin with plenty of water. If a large area is affected or symptoms occur, call 999/111.**

**(Turn over)**



- **OTHER ETHANOL FIRES**  
Allow fires in sinks, etc. to burn out. Fires at the top of test tubes, beakers etc. can be smothered with a damp cloth or heat-resistant mat if this can be done safely.
- **SPILT ON FLOOR, BENCH, ETC.**  
For small amounts, use a damp cloth. Rinse well. For larger amounts, cover with mineral absorbent (e.g. cat litter) and scoop into a bucket. Neutralise alkali with citric acid. Rinse with water.



<b>Question number</b>	<b>Additional page, if required. Write the question numbers in the left-hand margin.</b>



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