

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE



S25-3400U30-1C

MONDAY, 6 JANUARY – FRIDAY, 21 FEBRUARY 2025

BIOLOGY – Unit 3 (3400U30)

PRACTICAL ASSESSMENT

INVESTIGATING THE EFFECT OF GLUCOSE
CONCENTRATION WHEN TESTING FOR DIABETES

SECTION A

1 hour

For Examiner's use only		
	Maximum Mark	Mark Awarded
Section A	6	

ADDITIONAL MATERIALS

A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) 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.

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Introduction

Your task is to carry out an investigation into the effect of glucose concentration when testing for diabetes.

Apparatus Required

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

eye protection

1 × 250 cm³ beaker

5 × test tube containing 2 cm³ of glucose solution at concentrations of 10%, 20%, 30%, 40% and 50% in a test tube rack

1 × stopwatch

1 × Bunsen burner

1 × tripod and gauze

1 × heatproof mat

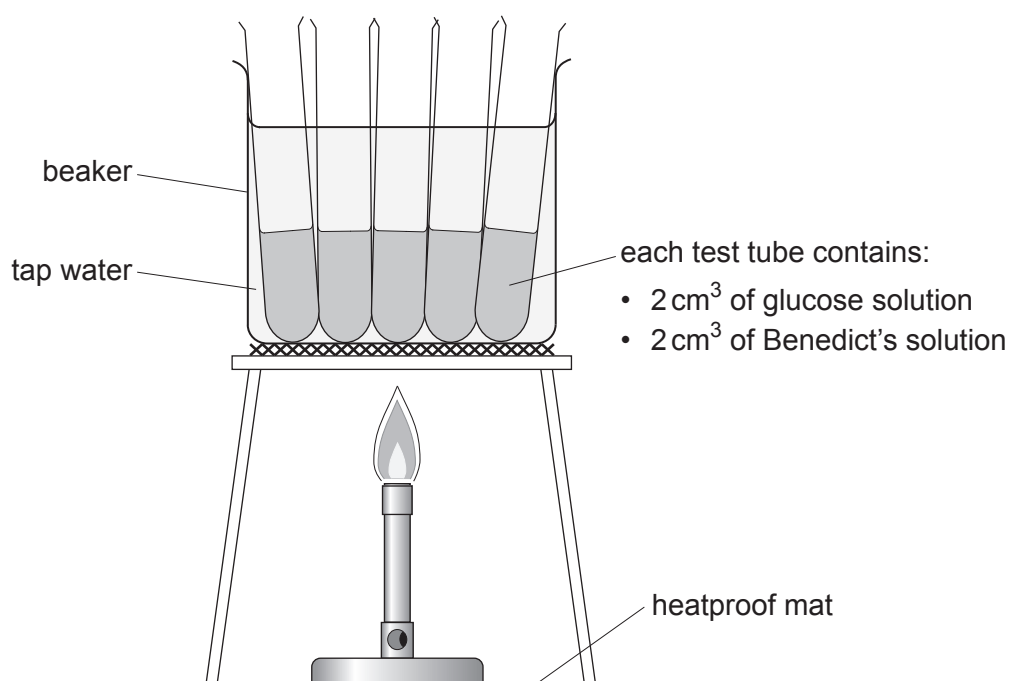
1 × bottle of Benedict's solution

1 × 2 cm³ pipette

splints

CLEAPSS student safety sheet: 4 – Food Testing (1). This is provided on page 6 of this examination paper.

Diagram



Read the method and answer questions 1.(a) and 1.(b) before carrying out the experiment and recording your results.

Method

1. Wear eye protection.
2. Half fill the 250 cm³ beaker with cold tap water. Place this onto the tripod and gauze.
3. Use the pipette to add 2 cm³ of Benedict's solution to each test tube of glucose solution.
4. Place all five test tubes into the beaker of cold water.
5. Use a lighted splint to light the Bunsen burner. Use the blue flame to heat the beaker of water containing the five test tubes.
6. Once the Bunsen burner is lit, start the stopwatch.
7. Record the time taken **in seconds** for the contents of each test tube to turn completely orange/brick red.



SECTION AAnswer **all** questions.

1. (a) State a hypothesis for this experiment. [1]

.....

.....

- (b) Complete the risk assessment below for this experiment. [2]
Use the student safety sheet on page **6** of this examination paper.

HAZARD	RISK	CONTROL MEASURE
Benedict's solution is an	Transfer from hands to eyes when using the solution	
Hot apparatus		

You may record raw results in the space below.



(c) Present your results in a table. Include all of your results.

[3]

Examiner
only

END OF PAPER

6



Student safety sheets

4

Food testing (1)

Substance	Hazard	Comment
Food	 BIOHAZARD	Uncooked samples of food may be contaminated with microbes. Some people are allergic to some foods, especially peanuts.
Fehling's solution Used to test for reducing sugars	 CORROSIVE	Solution A contains slightly-acidic copper sulfate solution. Solution B contains 3 mol/dm ³ sodium hydroxide solution. Solution A DANGER: Causes serious eye damage and skin irritation. Solution B DANGER: Causes severe eye damage and skin burns. As the mixture has to be heated in a test tube, there is a risk of alkali spitting out.
Benedict's solution Used to test for reducing sugars	 IRRITANT	Contains slightly-alkaline 0.07 mol/dm ³ copper sulfate solution. WARNING: Irritant to skin and eyes. Some risk of spitting when heating test tubes.
Ethanol Used to test for fats (lipids)	   HIGHLY FLAMMABLE HARMFUL HEALTH HAZARD	Most schools use IDA (industrial denatured alcohol) rather than pure ethanol. DANGER: highly flammable, harmful by ingestion, may cause damage to organs, causes serious eye irritation. If Bunsen burners are being used nearby for other food tests, there is a serious fire risk.
Iodine solution Used to test for starch	Currently not classified as hazardous	The solution is so dilute (about 0.01 mol/dm ³) that it presents only a LOW HAZARD.
Biuret test Used to test for proteins	 CORROSIVE	DANGER/WARNING: The very dilute copper sulfate solution is currently not classified as hazardous. Sodium hydroxide solution may be CORROSIVE, IRRITANT or currently not classified as hazardous depending on concentration.

Typical control measures to reduce risk

- Do not taste foods in laboratories; avoid using products containing peanuts etc if there is a known allergy.
- Wear eye protection and use the smallest possible amounts of chemicals.
- Use Benedict's solution rather than Fehling's solution and heat with a water bath.
- Do not use ethanol if there are naked flames nearby.

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, or might somebody using a Bunsen be unaware of ethanol being used nearby?
- 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?

Emergency action

- In the eye** Irrigate the eye with gently running tap water for at least 20 minutes. Call 999/111.
- In 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. Irrigate the affected area with gently running tap water for 20 minutes. If a large area is affected or symptoms occur, call 999/111.
- Clothing catches fire** Push casualty to the floor, roll the body or smother flames on clothing or skin with fire blanket or other material. Cool burnt skin with gently running tap water for 20 minutes. Unless trivial, call 999/111.
- 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.



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