

**Advanced Subsidiary GCE**

## F223

**HUMAN BIOLOGY**

Unit F223: Practical Skills in Human Biology:  
Quantitative Task

**Specimen Task**

**For use from September 2008 to June 2009.**

**All items required by teachers and candidates for this task are included in this pack.**

**INFORMATION FOR CANDIDATES**

- Quantitative Task: Investigating the effect of temperature on osmosis in potato tuber tissue

**INFORMATION FOR TEACHERS**

- Mark scheme
- Instructions for Teachers and Technicians.

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Candidates answer on this task sheet.

Additional materials: ruler  
scientific calculator

### INSTRUCTIONS TO CANDIDATES

- Answer **all** parts of the task.

### INFORMATION FOR CANDIDATES

- The total number of marks for this task is **10**.

### ADVICE TO CANDIDATES

- Read each part carefully and make sure you know what you have to do before starting your answer.

FOR TEACHER'S USE		
	Max.	Mark
TOTAL	10	

This task consists of 4 printed pages.

## Quantitative Task: Investigating the effect of temperature on osmosis in potato tuber tissue

### Introduction

You are to investigate the effect of temperature on osmosis in potato tuber tissue by placing cylinders of potato in  $1.0 \text{ mol dm}^{-3}$  sucrose solutions at different temperatures and recording the change in mass of the potato.

It is your responsibility to work safely and to organise your time effectively.

Proceed as follows:

- 1 Label five boiling tubes  $30^{\circ}\text{C}$ ,  $35^{\circ}\text{C}$ ,  $40^{\circ}\text{C}$ ,  $45^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ .
- 2 Using the most suitable measuring instrument, place  $20 \text{ cm}^3$  of  $1.0 \text{ mol dm}^{-3}$  sucrose solution into each boiling tube.
- 3 Place each of the boiling tubes containing the sucrose solution into the correct water bath and leave for at least 5 minutes for the sucrose solution to reach the correct temperature.
- 4 Use the cork borer to obtain 5 cylinders of potato tuber tissue from a large baking potato. Trim off any peel.
- 5 Use a sharp scalpel and a ruler to cut the potato cylinders so that they are exactly 5.0 cm long.
- 6 Place the potato cylinders on a paper towel and blot off any surplus moisture.
- 7 Measure the mass of the potato cylinders to the nearest 0.1g.
- 8 Record the mass of each potato cylinders in the most suitable format in the space provided on page 3.
- 9 Immediately put the potato cylinders into the sucrose solution at the correct temperature.
- 10 Leave each potato cylinder in the sucrose solution for exactly 30 minutes.  
*Whilst waiting for 30 minutes prepare a suitable result table for recording the initial mass, final mass and change in mass of the potato cylinders.*
- 11 After 30 minutes, use forceps to carefully remove the potato cylinders from the sucrose solution.
- 12 Blot off the surface moisture and record the mass of each potato cylinder in the most suitable format in the space provided on page 3.
- 13 Calculate the percentage change in mass for each potato cylinder and record it in the most suitable format in the space provided on page 3.

**Results**

**(a)** Which measuring instrument did you use to measure out the sucrose solution?

.....

**(b)** Explain the reason for your choice.

.....

.....

.....

**(c)** State two variables that should have been controlled, but were not controlled in the procedure that you followed.

.....

.....

**Total [10]**

**END OF TASK**

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Unit F223: Practical Skills in Human Biology:  
Quantitative Task

**Specimen Mark Scheme**

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	<b>Max Mark</b>
selection of 20 cm <sup>3</sup> syringe explained in terms of increased accuracy;	1
appropriate explanation of why smaller syringes or measuring cylinder would be less accurate;	1
appropriate uncontrolled variables stated;	2
all raw data presented in a single table with columns correctly labelled;	1
glucose concentration recorded in column 1;	1
all data recorded to an accuracy of no more than one decimal place;	1
all units written correctly and in column headings only;	1
each percentage change calculated and recorded with correct units;	1
trend in data is appropriate;	1
<b>Total</b>	<b>[10]</b>

Unit F223: Practical Skills in Human Biology:  
Quantitative Task

**Instructions for Teachers and Technicians**

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This document consists of **3** printed pages and **1** blank page.

**This task relates to Module 1, Unit F221. There is no time limit but it is expected that it can be completed within one timetabled lesson.**

It is assumed that you will have completed the teaching of the above module before setting your students this task. This module has links to other modules which contain related learning experiences – please refer to your specification.

Candidates may attempt more than one Quantitative task with the best mark from this type of task being used to make up the overall mark for Unit F223.

### **Preparing for the assessment**

It is expected that before candidates attempt Human Biology (Unit F223) they will have had some general preparation in their lessons. They will be assessed on a number of qualities such as demonstration of skilful and safe practical techniques using suitable qualitative methods, the ability to make and record valid observations, and the ability to organise results suitably. It is therefore essential that they should have some advance practice in these areas so that they can maximise their attainment.

### **Preparing candidates**

At the start of the task the candidates should be given the task sheet.

Candidates must work on the task individually under controlled conditions with the completed task being submitted to the teacher at the end of the lesson. Completed tasks should be kept under secure conditions until results are issued by OCR.

Candidates should not be given the opportunity to redraft their work, as this is likely to require an input of specific advice. If a teacher feels that a candidate has under-performed, the candidate may be given an alternative task. In such cases it is essential that the candidate be given detailed feedback on the completed assessment before undertaking another Quantitative Task. Candidates are permitted to take each task **once** only.

### **Assessing the candidate's work**

The mark scheme supplied with this pack should be used to determine a candidate's mark out of a total of 10 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators it is preferable that teachers mark work using red ink, including any appropriate annotations to support the award of marks.

### **Notes to assist teachers with this task**

Teachers must trial the task before candidates are given it, to ensure that the apparatus, materials, chemicals etc provided by the centre are appropriate. The teacher carrying out the trial must complete a candidate's task sheet showing the results attained, and retain this, clearly labelled, so that it can be provided to the candidates when requested.

### **Health and Safety**

Attention is drawn to Appendix F of the specification.

## Investigating the effect of temperature on osmosis in potato tuber tissue

### Technicians' list

Each student will require:

#### Materials:

- 1 large baking potato
- 120 cm<sup>3</sup> 1.0 mol dm<sup>-3</sup> sucrose solution in a suitable labelled container

#### Apparatus:

- safety goggles
- 5 boiling tubes in a boiling tube rack \*
- permanent marker or labels
- 20 cm<sup>3</sup> syringe
- cork borer (10 mm)
- sharp scalpel
- board on which to cut
- 30 cm ruler (mm)
- paper towels
- thermometer
- stopwatch or stop clock (minutes)
- coarse forceps

#### Access to:

- balance (0.1g)
- thermostatically-controlled water baths set at 30°C, 35°C, 40°C, 45°C and 50°C with boiling tube racks

or

#### each student:

- beaker
- Bunsen burner
- tripod
- gauze
- test-tube holder
- heat proof mat
- access to cold water tap

**Note:** The quantities of chemicals required are approximate and due allowance should be made for wastage.

While this list is intended to meet all candidates' requirements, teachers may vary the materials, chemicals and apparatus provided in order to:

- ensure that the experiments guarantee appropriate outcomes for candidates
- make use of resources available at the centre, without the need to make special purchases.

Such changes may be made without consulting OCR. A note of any significant changes must be sent to the moderator when a sample is requested for moderation.

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