OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **2803/03/TEST**

BIOLOGY

Practical Examination 1 (Part B – Practical Test)

WEDNESDAY 9 JANUARY 2008 Morning

Time: 1 hour 30 minutes

Candidates answer on the question paper.
Additional materials: Candidate's Plan (Part A of the Practical Examination)
Electronic calculator
Ruler (cm/mm)

CUP/T39864

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Write your answers in the spaces provided on the question paper.
- Read the instructions and questions carefully before starting your answers.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- In this Practical Test, you will be assessed on the Experimental and Investigative Skills:
  - Skill I: Implementing
  - Skill A: Analysing evidence and drawing conclusions
  - Skill E: Evaluating.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.

FOR EXAMINER'S USE		
Qu.	**Max.**	**Mark**
Planning	**16**	
1	**28**	
2	**16**	
TOTAL	**60**	

This document consists of **11** printed pages, a Report Form and an Insert.

[Turn over

Answer **all** the questions.

Question 1 [60 minutes]

In this investigation you will determine the reducing sugar concentration of two liquids that have been specially prepared to resemble 'sports/energy' drinks.

Reducing agents, such as the reducing sugar glucose, can decolourise a pink solution of potassium manganate (VII).

You are provided with a range of glucose solutions and you will time how long it takes each solution to decolourise an acidified solution of potassium manganate (VII).

You will use your results to draw a graph. The reducing sugar concentration of the two 'sports/energy' drinks will then be determined from your graph.

Proceed as follows:

Sulphuric acid is corrosive  .

Potassium manganate (VII) solution is harmful  .

Safety glasses and protective gloves must be worn and care taken when handling these chemicals.

Wash off any splashes immediately with cold water.

1 You are provided with five boiling tubes labelled **A** to **E** which contain different concentrations of glucose, as shown in the table below.

tube	concentration of glucose/%
A	20
B	15
C	10
D	8
E	6

2 You are provided with one boiling tube labelled **Z**, which contains 17 cm^3 of distilled water. Place tube **Z** on the left hand side of the boiling tube rack.

Place tube **A** immediately to the right of tube **Z**. Place the strip of printed paper provided onto the boiling tube rack **beneath** tubes **Z** and **A**. You should be able to read the print clearly **by looking down from above through these tubes**.

*Before proceeding, read steps **3** to **6** and construct a table for your results on page 4.*

3 Use a 5 cm^3 syringe to add 5.0 cm^3 of sulphuric acid to tube **A**. Gently shake tube **A** to mix the two liquids.

4 Use a 2 cm^3 syringe to add 2.0 cm^3 potassium manganate (VII) solution to tube **A**. Gently shake tube **A** and return it to the rack. Immediately start a stopwatch or stop clock. After you have started timing, do **not** remove the tube from the rack and do **not** shake it.

5 Carefully observe the appearance of tube **A** as the pink colour disappears. When the print through tube **A** (viewed from above) is as clear as the print viewed through tube **Z**, note the time and record the result in your table.

Remove tube **A** and replace with tube **B**.

6 Repeat steps **3** to **5** with the remaining tubes, **B** to **E**.

(a) (i) Explain the advantage of using tube **Z**.

.....

.....

.....

.....

(ii) Suggest why, in step **4**, it is important not to shake the tube **after** starting the stopwatch or stop clock.

.....

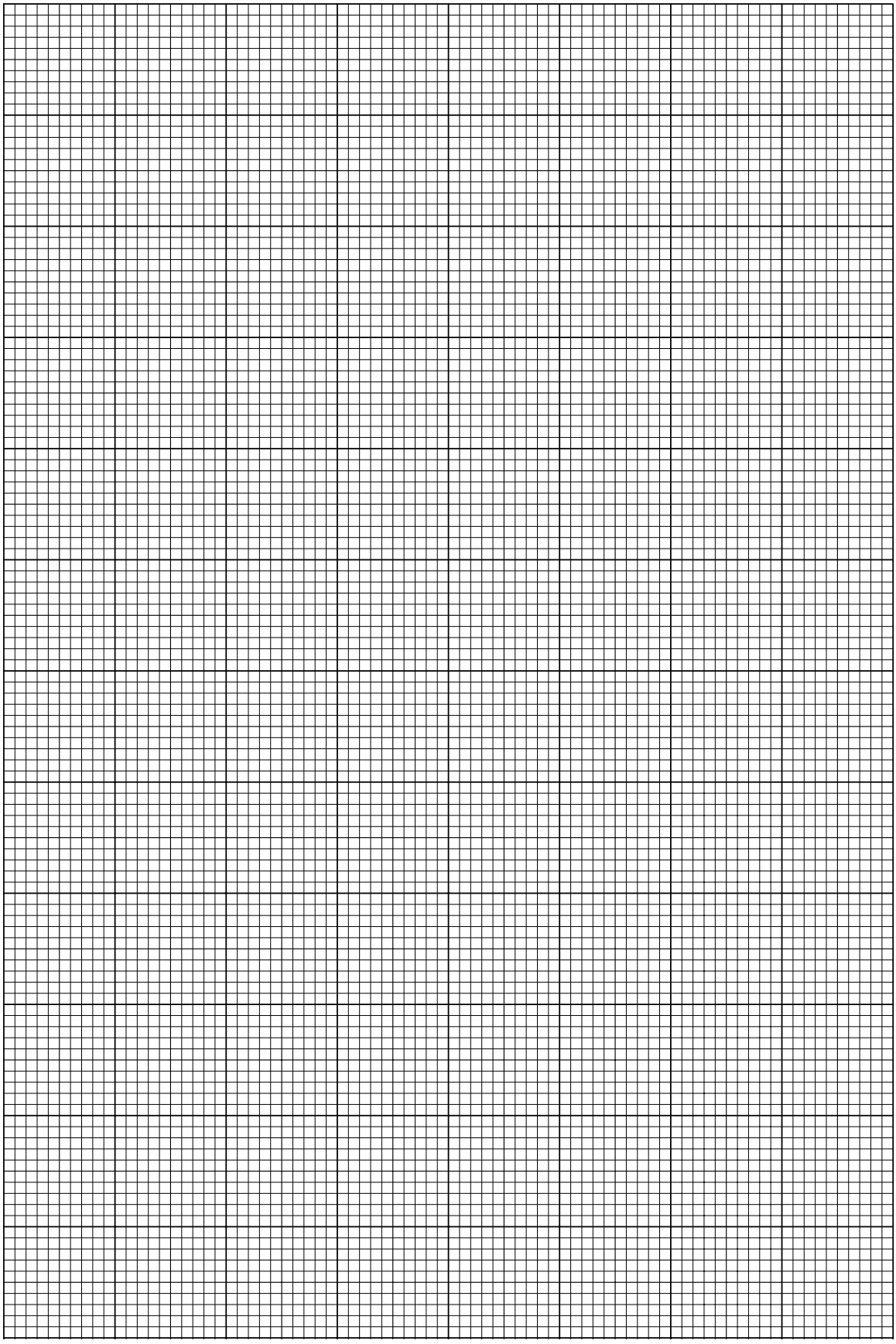
.....

.....

.....

(b) Record your results in a table in the space below.

(c) Plot a graph of your results on page 5.



(d) **Describe** the graph that you have drawn and **explain** the trend you describe.

You will gain credit for using figures from your graph.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(e) You are provided with two different 'sports/energy' drinks in boiling tubes **F** and **G**.

Use the method that you used in steps **3** to **5** and your graph to find the glucose concentrations of **F** and **G**.

- Use the space below to record your results.
- Indicate **on your graph** how you arrive at your estimate of the glucose concentrations of **F** and **G**.
- Write your answers in the spaces provided below.

glucose concentration of **F** = ... %

glucose concentration of **G** = ... %

(f) 'Sports/energy' drinks may be classified into three categories:

- **High energy drinks**. These contain high concentrations of sugars (greater than 10%) to give people an 'energy boost'.
- **Sports drinks**. These contain moderate concentrations of sugars (6 to 8%). They are designed to be about the same water potential as the blood and to replace fluids lost by sweating.
- **Low energy drinks**. These contain less sugar than sports drinks and are designed to replace fluids lost in sweating without giving an 'energy boost'.

(i) Identify the categories to which **F** and **G** belong.

F .....

G .....

(ii) Explain why 'sports/energy' drinks contain sugars, such as glucose, rather than complex carbohydrates, such as starch.

.....

.....

.....

.....

(g) Evaluation exercise.

Procedures for measuring the quantity of sugar, such as the one you have followed, may be criticised for their lack of precision and poor reliability.

Give **four** criticisms of the method that you have followed. For each criticism that you give, state **one** way in which the procedure could be improved.

criticism 1 .....

.....

improvement .....

.....

.....

criticism 2 .....

.....

improvement .....

.....

.....

criticism 3 .....

.....

improvement .....

.....

.....

criticism 4 .....

.....

improvement .....

.....

.....

[Total: 28]

Question 2 [30 minutes]

K1 is a slide showing a transverse section of the aorta of a small mammal.

Use a hand lens and the low power objective of your microscope to observe **K1**.

(a) (i) In the space below, make a low power plan drawing to show the tissues of the aorta.

(ii) Label your drawing.

(iii) Annotate your drawing to describe the **appearance** of the tissues that you have labelled.

(b) Fig. 2.1, **on the insert**, shows a photomicrograph of a healthy section of a coronary artery from a human heart.

Fig. 2.2, **also on the insert**, shows a photomicrograph of a section of a coronary artery of similar diameter. This section has an atheromatous plaque and a large blood clot. The plaque and the blood clot have reduced the size of the lumen of this section of artery.

(i) Use the 2 mm × 2 mm squared transparency grid provided to estimate the area of that part of the lumen that remains **unobstructed** in the photomicrograph shown in Fig. 2.2.

Show your working and express your answer **to the nearest mm^2**.

Answer = ... mm^2

(ii) The area of the lumen in the photomicrograph of the healthy artery in Fig. 2.1 has been estimated as 2230 mm^2.

Use your result from **(b)(i)** to calculate the percentage of the lumen of the artery in Fig. 2.2 that has been **blocked** by the plaque and the blood clot.

Show your working and express your answer **to the nearest whole number**.

Answer = ... %

(c) The blockage shown in Fig. 2.2 will affect the tissues in the wall of the heart.

Explain why such a blockage could lead to a heart attack (myocardial infarction).

.....

.....

.....

.....

.....

.....

(d) It is possible to use a variety of scanning and X-ray imaging techniques to view the coronary arteries in someone suspected of having coronary heart disease.

Explain why it is important to view all the coronary arteries in someone suspected of having coronary heart disease and not just a small region of one coronary artery.

.....

.....

.....

.....

[Total: 16]

REPORT FORM

The teacher responsible for the supervision of the Practical Test is asked to report on the following:

(a) Any particular difficulties encountered in making preparations for the Practical Test.

(b) Whether it was necessary to make any substitutions for the materials listed in the Instructions. Submit a copy of the results obtained by a teacher or technician, using the substituted materials, on top of the candidates' scripts.

(c) Any difficulties experienced by the candidate due to deficient materials or faulty apparatus. If so, give brief details.

(d) Any assistance given to the candidate with respect to colour blindness or other physical disability. If so, give brief details, and attach a copy of the letter giving permission.

Other cases of hardship, for example illness, should be reported directly to OCR by the Examinations Officer using the Special Consideration form.

Signed .....

Information that applies to **all** candidates should be given on the first candidate's script **only** or supplied on a separate sheet placed on top of the candidates' scripts.