

Centre Number						Candidate Number				
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Other Names										
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For Examiner's Use Total Task 2



General Certificate of Education
Advanced Subsidiary Examination
June 2011

Human Biology

HB13X/PM2

Unit 3X AS Externally Marked Practical Assignment

Task Sheet 2

To be completed before the EMPA Written Test.

For submission by 15 May 2011

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Comparing normal semi-skimmed milk and 'lactose free' semi-skimmed milk

Introduction

Lactose is a disaccharide found in milk and milk products. Lactase is an enzyme that digests lactose. During digestion, lactose is broken down into two monosaccharides, glucose and galactose. How much lactose has been broken down can be determined from how much glucose is produced.



Some people do not produce lactase and are lactose intolerant. Milk can be bought that is described as 'lactose free'. This milk has had lactase added to it during the production process. People with lactose intolerance can drink this type of milk.

Task 2

In Task 2, you will investigate the action of lactase on two samples of milk, labelled **Milk A** and **Milk B**. One milk is normal semi-skimmed milk and the other is 'lactose free' semi-skimmed milk. You will not be told which milk is in **A** and which milk is in **B**. You will measure the concentration of glucose in each milk before and after you add lactase to it. In some cases there may be no glucose present. All your experiments will be carried out at room temperature.

Materials

You are provided with

- **Milk A**
- **Milk B**
- lactase solution
- pH7 buffer
- glucose test strips
- colour chart
- test tubes
- test tube rack
- graduated pipettes or syringes
- timer
- marker pen

You may ask your teacher for any other apparatus you require.

Method

Read these instructions carefully before you start your investigation.

The procedure for using glucose test strips is as follows:

- dip the coloured end of a test strip into the solution being tested for five seconds
- wipe the strip against the top of the tube to remove excess solution
- wait two minutes for any colour change to develop. Ignore colour changes that occur after two minutes
- compare the test strip colour with the standard colour chart and record the concentration of glucose.

1. Label two test tubes, **1** and **2**.
2. Put 2 cm³ of **Milk A** and 1 cm³ buffer into tube **1**.
3. Measure the concentration of glucose by using a glucose test strip.
4. Put 2 cm³ of lactase solution into tube **2**.
5. Add the contents of tube **1** to tube **2**, mix and start the timer.
6. After 2 minutes use a glucose test strip to measure the concentration of glucose.
7. Repeat steps 1 to 6 for **Milk B**.

You will need to decide for yourself

- how many repeats to use for each sample of milk
- if the test strip colour is intermediate between two consecutive colours on the chart and whether an estimate of the concentration of glucose is required
- how to interpret the test strip results.

Turn over ►

Presenting data

- 7 Record the results of your investigation in an appropriate table in the space below.
(4 marks)

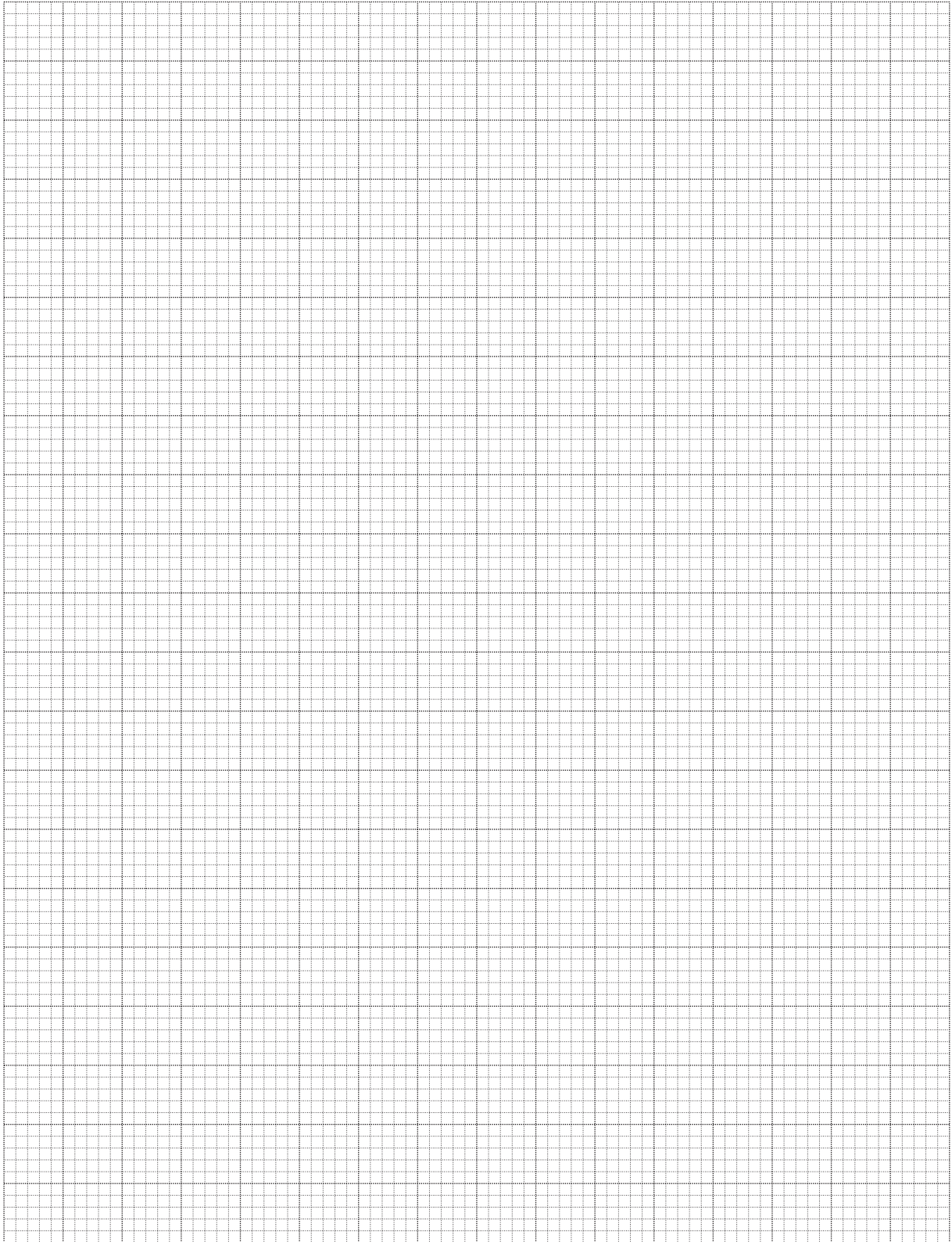
Use the space below to do any calculations.

Turn over ►

8

Use the graph paper to plot an appropriate graph of your processed data.

(6 marks)



END OF TASK 2

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