

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

For Examiner's Use Total Task 2

General Certificate of Education
June 2009
Advanced Subsidiary Examination



HUMAN BIOLOGY
Unit 3X Externally Marked Practical Assignment
Task Sheet 2

HB13X/PM2

To be completed before the EMPA Written Test.

For submission by 15 May 2009

You must have

- a ruler with millimetre measurements
- a calculator.

You are provided with cows' milk. As the number of bacteria in milk increases, the concentration of oxygen in the milk decreases. A fall in the concentration of oxygen can be detected using a solution of resazurin. Resazurin will change colour depending on the concentration of oxygen. The colour change is gradual over the following range:

[high oxygen concentration]	blue → mauve → pink → pale pink → white	[low oxygen concentration]
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The rate of increase in the number of bacteria depends on the temperature at which the milk is kept.

You will add resazurin to a sample of milk at a particular temperature and measure how long it takes for the resazurin to turn pink. You will repeat the experiment at four other temperatures. Your teacher will tell you the five temperatures to use.

A Setting up your investigation

You are provided with

- 100 cm³ milk
- 0.005 % resazurin solution
- large beakers that you can use as water baths or access to water baths
- thermometer
- test tubes with bungs or caps
- test tube rack
- timer
- graduated pipettes or syringes
- marker pen

You may ask for any other apparatus you require.

You should read these instructions carefully before you start work.

B Carrying out the investigation

1. Add 5 cm³ of the milk sample to a test tube. Seal the test tube.
2. Place this test tube in the first water bath temperature and leave for 5 minutes.
3. After 5 minutes, remove the cover and add 0.5 cm³ resazurin solution to this test tube. Replace the cover immediately and start the timer.
4. Record how long it takes for the resazurin solution to go pink.
5. Use the same method to find out how long it takes for the resazurin solution to go pink at the four other temperatures.

You will need to decide for yourself:

- how many repeats to use with each temperature
- whether there are other variables to control that might influence the data to be collected
- how to ensure the reliability of the end-point of each experiment.

C Presenting data

Record your data in an appropriate table.

(4 marks)

D Processing data

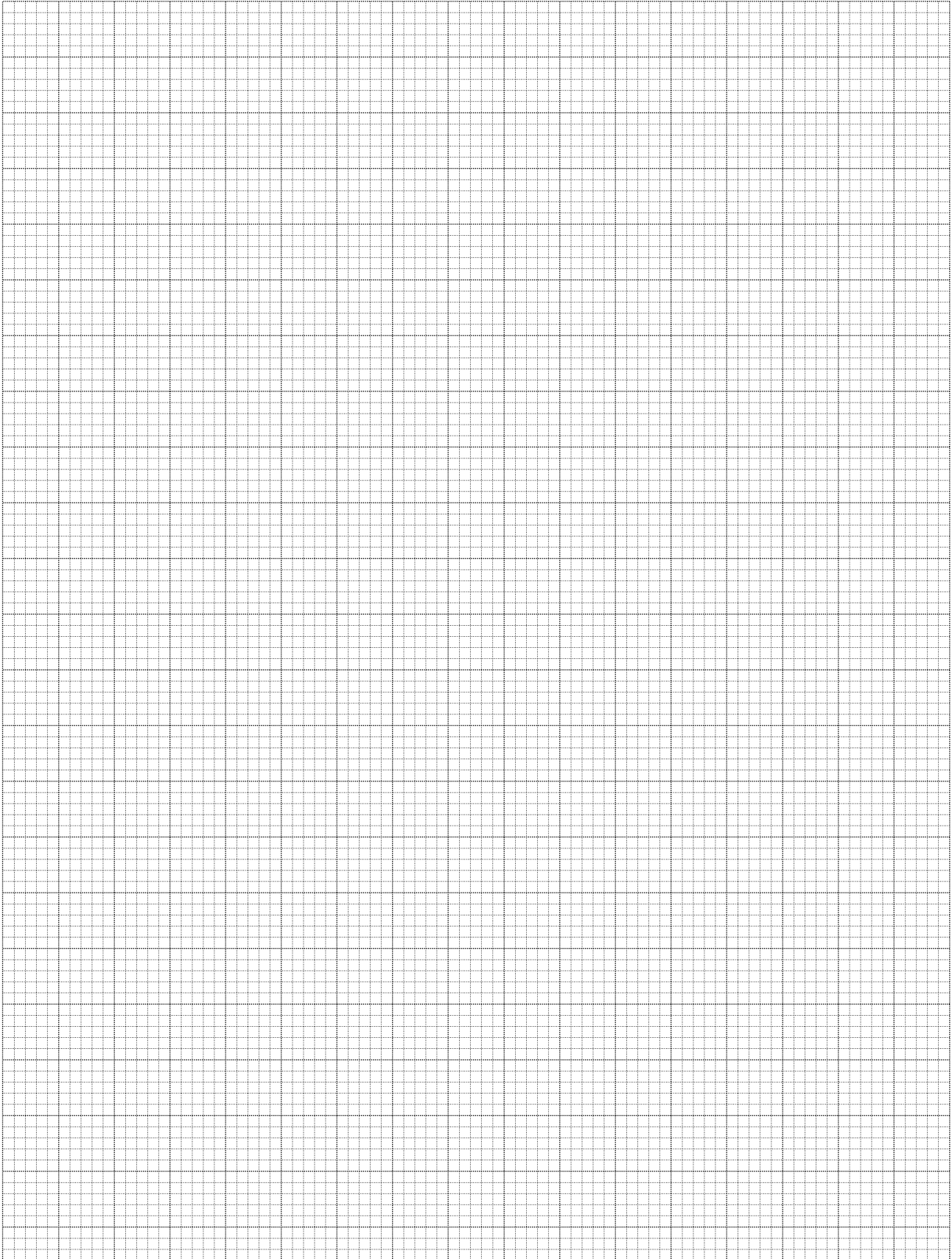
Use this page to do any calculations.

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Plot an appropriate graph of your data.

(6 marks)



END OF TASK 2

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