

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



General Certificate of Education
Advanced Subsidiary Examination
June 2012

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 2012

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Trypsin: hero and villain

Introduction

Trypsin is an enzyme important in the digestion of proteins in the gut.

Task 2 - Investigating the effect of different trypsin concentrations on the rate of digestion of milk protein

In Task 2, you will investigate the effect of different concentrations of trypsin solution on the rate of digestion of the protein in milk.

Materials

You are provided with

- 1% trypsin solution
- milk
- water
- beaker and warm water
- 10 test tubes
- test tube rack
- graduated pipettes or syringes
- thermometer
- timer
- marker pen

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

Outline Method

To assist your planning, note that it could take up to 10 minutes for the contents of your tubes to go clear.

Read these instructions carefully before you start your investigation.

1. Set up a water bath at approximately 35 °C by half filling the beaker with warm water. Maintain the temperature by topping up with hot water, or replace the water if necessary.
2. Label five test tubes **A** to **E**.
3. Put 5 cm³ of milk in each of tubes **A** to **E** and place all of these tubes in the water bath.

4. Label five test tubes **1** to **5**.
5. Use the 1% trypsin solution and water to make five different concentrations of trypsin solution in tubes **1** to **5** as shown in the table.

Tube number	Volume of 1% trypsin used / cm^3	Volume of water used / cm^3	Concentration of trypsin solution / %
1	0.10	0.90	0.10
2	0.25	0.75	0.25
3	0.50	0.50	0.50
4	0.75	0.25	0.75
5	1.00	0.00	1.00

6. Place tubes **1** to **5** in the water bath and leave for a suitable length of time.
7. After this time, add the contents of tube **1** to tube **A** and start the timer immediately.
8. Record, in seconds, the time taken for the contents of the tube to go clear.
9. Repeat steps 7 and 8 but adding tube **2** to tube **B**, then tube **3** to tube **C**, then tube **4** to tube **D**, then tube **5** to tube **E**.

You will need to decide for yourself

- how long to leave the tubes in the water bath
- how many repeats to use for each concentration of trypsin
- when the contents of a tube have gone clear.

Turn over for Question 7

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Presenting data

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

Processing data

- 8 Use your data to calculate the relative rate of reaction with each concentration of trypsin. To help the plotting of your graph, use the following formula:

$$\text{Relative rate of reaction of trypsin} = \frac{1000}{t}$$

Where t is the time taken for the contents of the tube to go clear and the relative rate of reaction will use the units of $\frac{1000}{t}$

(1 mark)

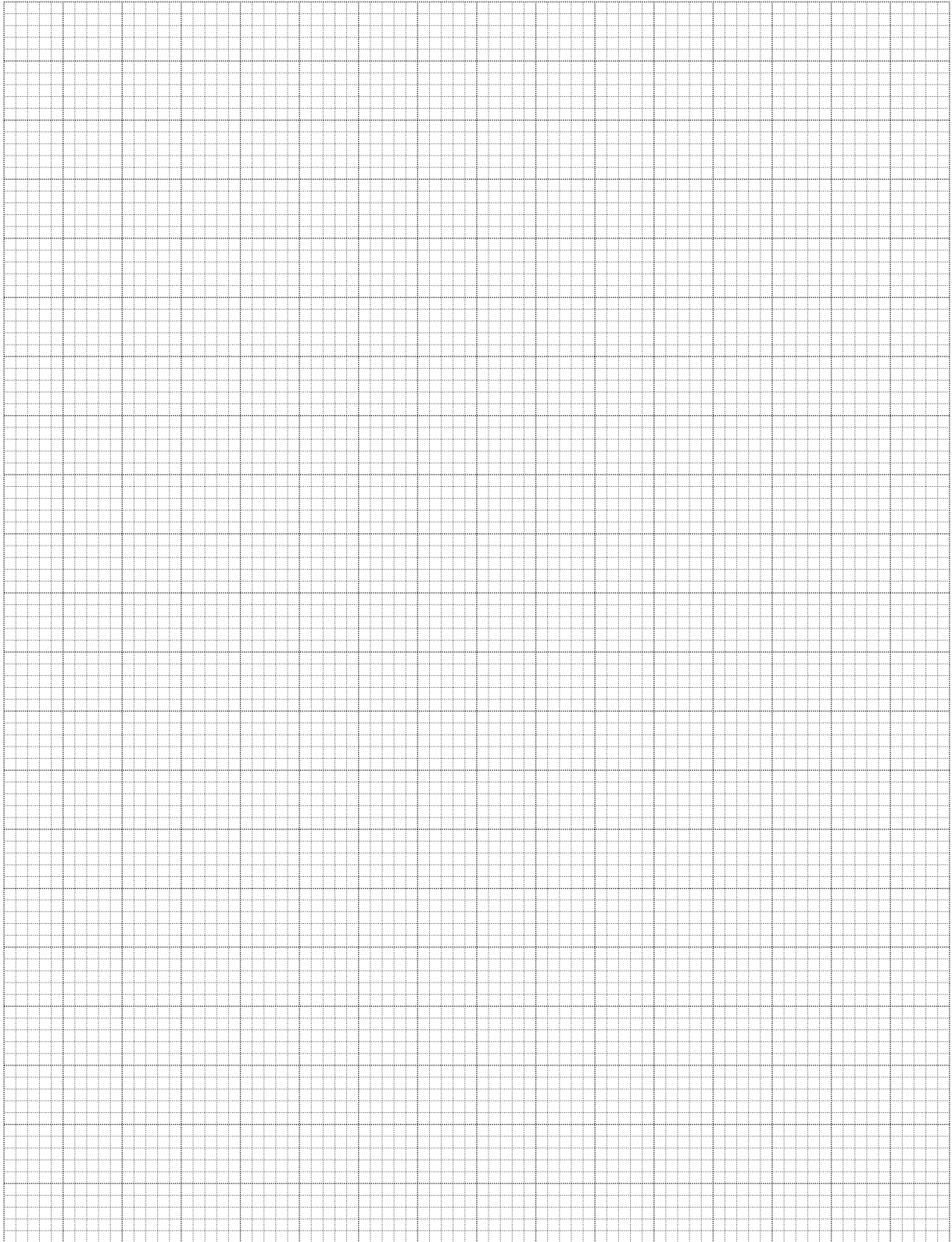
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9

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

(5 marks)



END OF TASK 2

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