Candidate Name	Centre Number	Candidate Number
		2

General Certificate of Education
Advanced Subsidiary/Advanced

313/01

BIOLOGY PRACTICAL – BI3
SPRING AND SUMMER 2008

For examiner's use	
1	
2	
3	
Total	

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces provided above.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

You are reminded that this is a record of your own work and that no certificate will be awarded to a candidate detected in any unfair practice.

Recommended maximum times:

Question 1 45 minutes

Question 2 1hr 15 minutes implementation, 45 minutes analysis

Question 3 60 minutes

Question 1: Planning. This is a planning exercise only. There is no need to carry out the investigation.

Investigation:

Rennin is an enzyme used to clot milk in the production of cheese. Over the years the type of rennin used in the process has changed and cheese makers now use rennin from bacteria. One manufacturer has investigated the ideal temperature for this enzyme and believes that by altering the temperature of the vat used for clotting, the time taken for milk to clot can be reduced.

The aim of your investigation is to find the ideal temperature for rennin to clot milk.

(a) Give a prediction for your investigation which clearly links the two variables in your investigation. [2]

.....

.....

.....

(b) Briefly describe the biological theory behind your investigation. [4]

.....

.....

.....

.....

.....

.....

(c) List all the apparatus that you will require to carry out your investigation. [2]

.....

.....

.....

.....

.....

.....

(d) Draw a diagram of the apparatus you intend to use (set up and not individual pieces of equipment). [3]

(e) Identify the key variables under the following headings, stating the units.

(i) Independent variable ..... [1]

(ii) Dependent variable ..... [1]

(iii) Name a variable which must be kept the same throughout your investigation. [1]

.....

(f) Safety Risk Assessment.

Why might the enzyme be considered a safety risk? [1]

.....

How can this risk be minimised? [1]

.....

.....

(g) Describe how you would carry out your investigation. It is important to give the essential details for each step that you would use, so that another person could carry out your investigation. [10]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Examiner only

(Total 26 marks)

Turn over.

Question 2: Analysis and Evaluation

This investigation is to determine the water potential of parsnip (or similar vegetable).
You are given a 1 M sucrose solution and a parsnip for your investigation, along with a variety of pieces of apparatus. Follow the instructions carefully and record your results in a table.

1. Label each of 6 specimen tubes as follows:
   distilled water; 0.6 M; 0.5 M; 0.4 M; 0.3 M; and 0.2 M.

2. Using these tubes, make up the solutions starting from your 1 M stock solution, using the table below as a guide.

Molarity of solution /M	*Volume of sucrose /cm^3*	*Volume of distilled water /cm^3*
0.9	9	1
0.8	8	2
0.7	7	3
0.6		
0.5		
0.4		
0.3		
0.2		

3. You should have 10 cm^3 distilled water in your labelled tube and an equal volume of the different strength solutions in the others, as appropriate. Each tube should be firmly stoppered.

4. Using a cork borer, prepare 6 solid cylinders of parsnip. Each cylinder should be the same diameter and 12 mm long.

5. Using a scalpel, slice each cylinder into 6 discs of approximately equal thickness.

6. Place each group of discs on a separate piece of filter paper.

7. Weigh each group of discs and note the mass.

8. Put the groups of discs in each of the labelled tubes, noting the mass placed in each tube. Stopper and leave for 20 minutes.

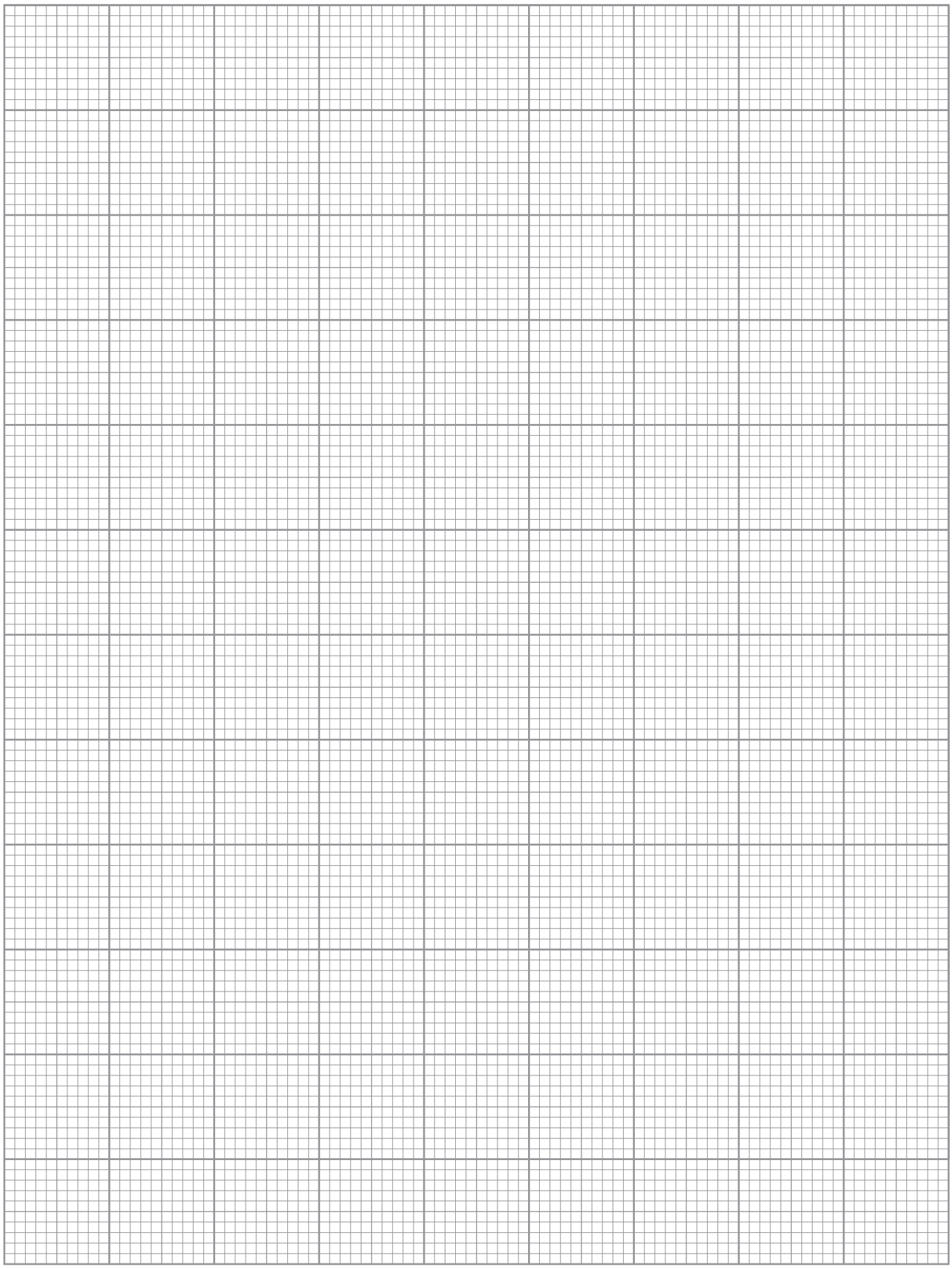
9. After 20 minutes remove the discs from each tube, in the same order as they were put into the tubes, remove the excess water quickly and gently with a paper towel and reweigh them.

10. Calculate the percentage change in mass and record this in your table.

(a) Below, record your results accurately and clearly in a table. [4]

Examiner only

(b) Draw a graph, from your table of results, on the grid below. [6]



(c) (i) Suggest **one** way in which the reliability could have been improved. [1]

.....

.....

(ii) Suggest **one** way in which the accuracy could have been improved. [1]

.....

.....

(d) Describe the pattern shown by **your** graph. [3]

.....

.....

.....

.....

.....

(e) Explain **your** results, in biological terms. [5]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(f) In a similar experiment the parsnip was heated to 75°C before being used. What would you expect to happen and explain why. [3]

.....

.....

.....

.....

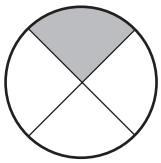
(Total 23 Marks)

Question 3: Observation and Microscopy

You are provided with the following:

Microscope, eye piece graticule, stage micrometer and a prepared slide of a transverse section, TS, leaf of marram grass *(Ammophila)*.

(a) Draw a low power plan of a representative part of the leaf, as shown below. Label your diagram with only the labels you have used as part of your course. [6]



(b) Measure the thickness of the leaf in 3 places. [2]

Using the following letters, note clearly on your drawing where you measured your leaf.

X-X .....

Y-Y .....

Z-Z .....

(c) Calibrate the eyepiece graticule at low power. Record all your workings in the space below. All your steps must be clear and easy to follow. [3]

.....

.....

.....

.....

.....

.....

(d) Using your calibration and your **X-X** measurement from *(b)*, in eye piece units, calculate the actual value for your measurement. [2]

.....

.....

.....

(e) Calculate the magnification of your drawing using your measured leaf thickness **X-X** from part *(b)*. Show all your workings clearly. [2]

.....

.....

.....

(Total 15 marks)