Centre No.						Surname	Initial(s)
Candidate No.						Signature	

Paper Reference(s)

4325/03

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Biology

Paper 3 (Foundation and Higher tiers)

Monday 16 May 2005 – Afternoon

Time: 1 hour 15 minutes

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
Total	

Materials required for examination
Ruler, pencil and eraser

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number and candidate number, your surname, initial(s) and signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer **ALL** the questions in the spaces provided in this question paper.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

There are 12 pages in this question paper. All blank pages are indicated.
The total mark for this paper is 50. The marks for the parts of questions are shown in round brackets: e.g. (**2**).

Advice to Candidates

Write your answers neatly and in good English.

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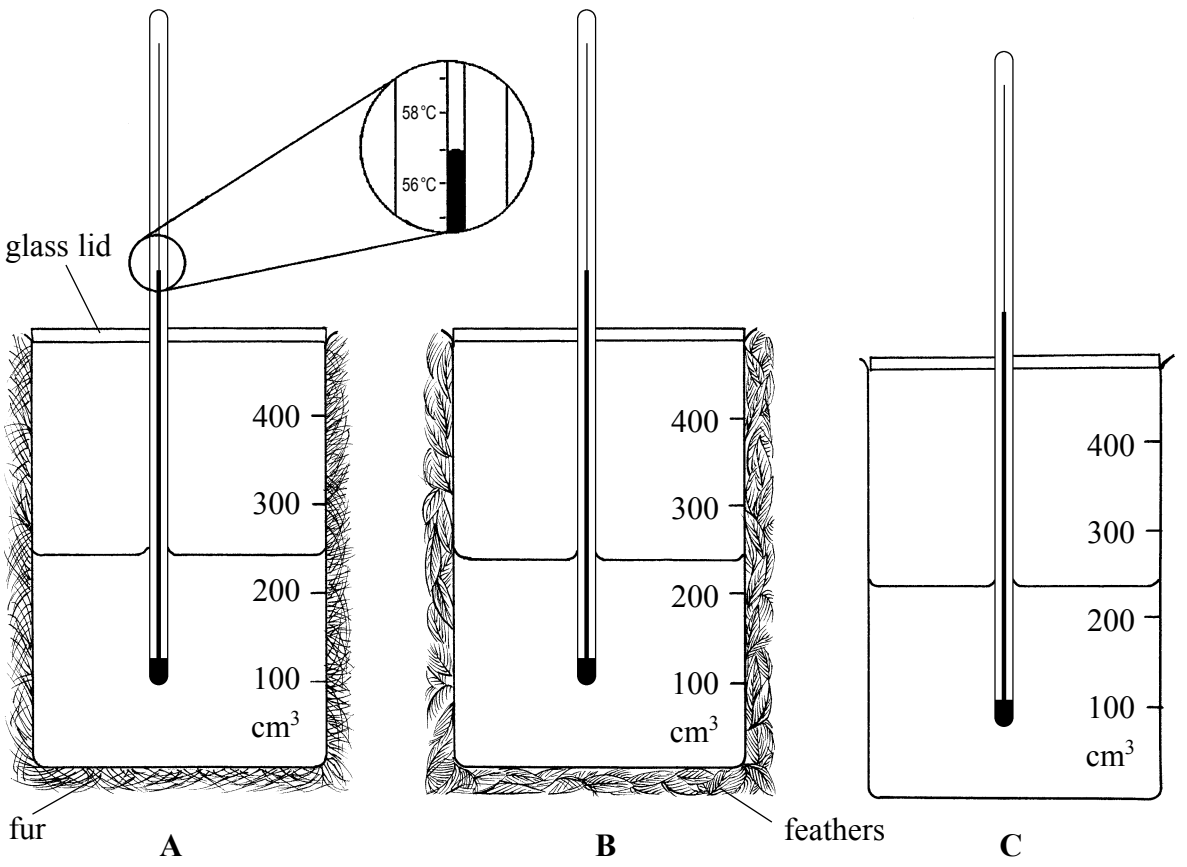
1. A student wanted to study loss of heat from organisms. He used beakers filled with hot water as models of organisms. The diagram shows the apparatus he used.



(a) Look at the thermometer in beaker **A**.

(i) What unit is used to measure temperature?

.....

(1)

(ii) Write down the temperature of the water in beaker **A**.

.....

(1)

(b) Look carefully at the water level in beaker **C**.

Write down the volume of water and give the units.

.....

(2)

(c) Which beaker do you think would lose heat most quickly? Give a reason for your answer.

.....

.....

(2)

Q1

(Total 6 marks)

Leave blank

2. The five steps listed below describe how to test a food sample for a simple sugar (reducing sugar).

The steps are in the correct order.

1. Crush food sample in some water, using a pestle and mortar.
2. Put crushed food sample in a test tube and add reagent A.
3. Place the test tube in a water bath at 70 °C.
4. Leave for 2 minutes.
5. Look to see if there is a colour change.

(a) (i) Why is the food sample crushed in step 1?

.....

.....

(1)

(ii) What is the name of reagent A added in step 2?

.....

(1)

(iii) In step 3 the test tube is heated. Why is a water bath used rather than heating the test tube directly with a Bunsen burner?

.....

.....

(1)

(iv) Suggest why step 4 is needed.

.....

(1)

(b) Two food samples were tested. Complete the table below to show the colours you would expect.

Colour of reagent A at start	**Colour of reagent A at end**	
	food sample containing glucose	
	food sample containing protein	

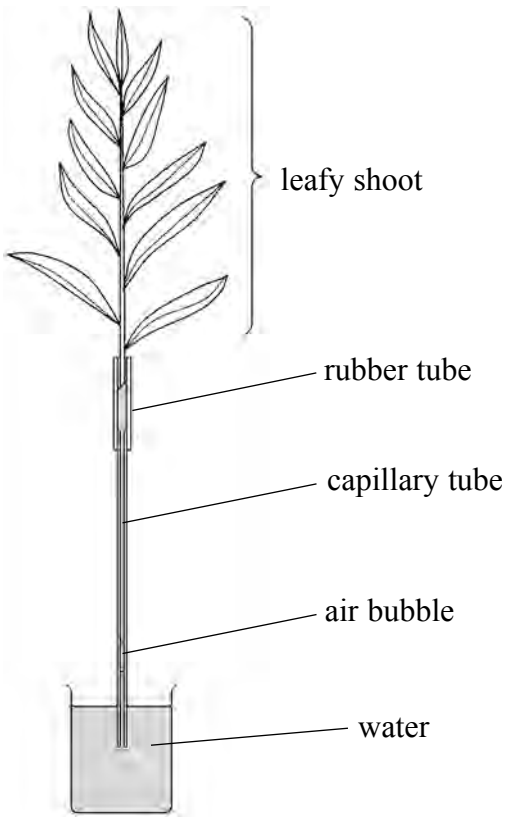
(3)

Q2

(Total 7 marks)

Leave blank

3. A student set up apparatus to investigate the rate of transpiration from a leafy shoot. A diagram of the apparatus is shown below.



(a) Name **one** piece of the apparatus that contains water.

.....

(1)

(b) Where on the apparatus is it important to have an air tight seal?

.....

(1)

(c) To measure the rate of transpiration the student also used a ruler and a stopclock.

(i) Draw a ruler on the diagram to show where it should be placed.

(1)

(ii) In what unit would the student measure the rate of transpiration?

.....

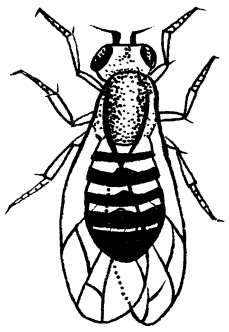
(1)

Q3

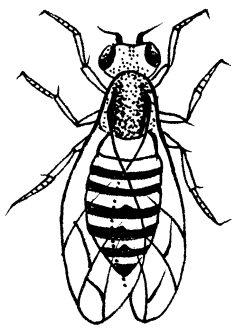
(Total 4 marks)

Leave blank

4. The fruit fly is an organism used in studies of inheritance. Male and female fruit flies look different. You can see these differences in the diagram.

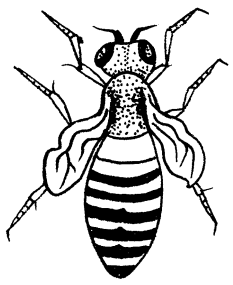


male fly



female fly

One mutant strain has very small wings. These are known as vestigial wings.



female fly with small (vestigial) wings

A biology teacher set up a cross between male fruit flies with normal wings and female fruit flies with small (vestigial) wings.

The offspring are shown on page 7.

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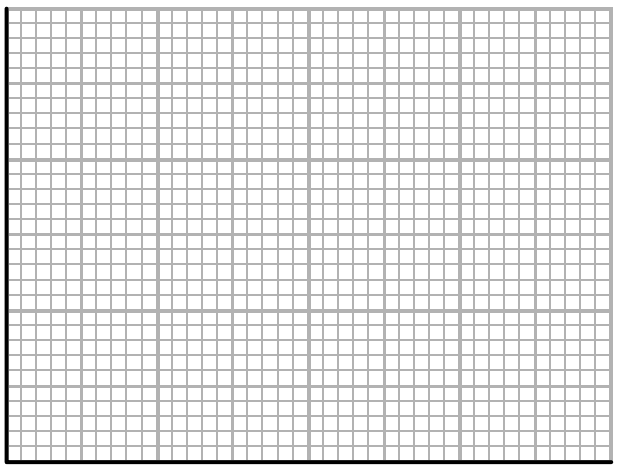
(a) (i) Count the number of male and female flies with small wings and put the tally and the total in the table below. The flies with normal wings have been done for you.

Type of fly	Tally	Total
female with normal wings	///// ///// ///// ////	19
male with normal wings	///// ///// ///// /////	20
female with small wings		
male with small wings		

(4)

(ii) Plot a bar chart of the four types of flies produced.



(4)

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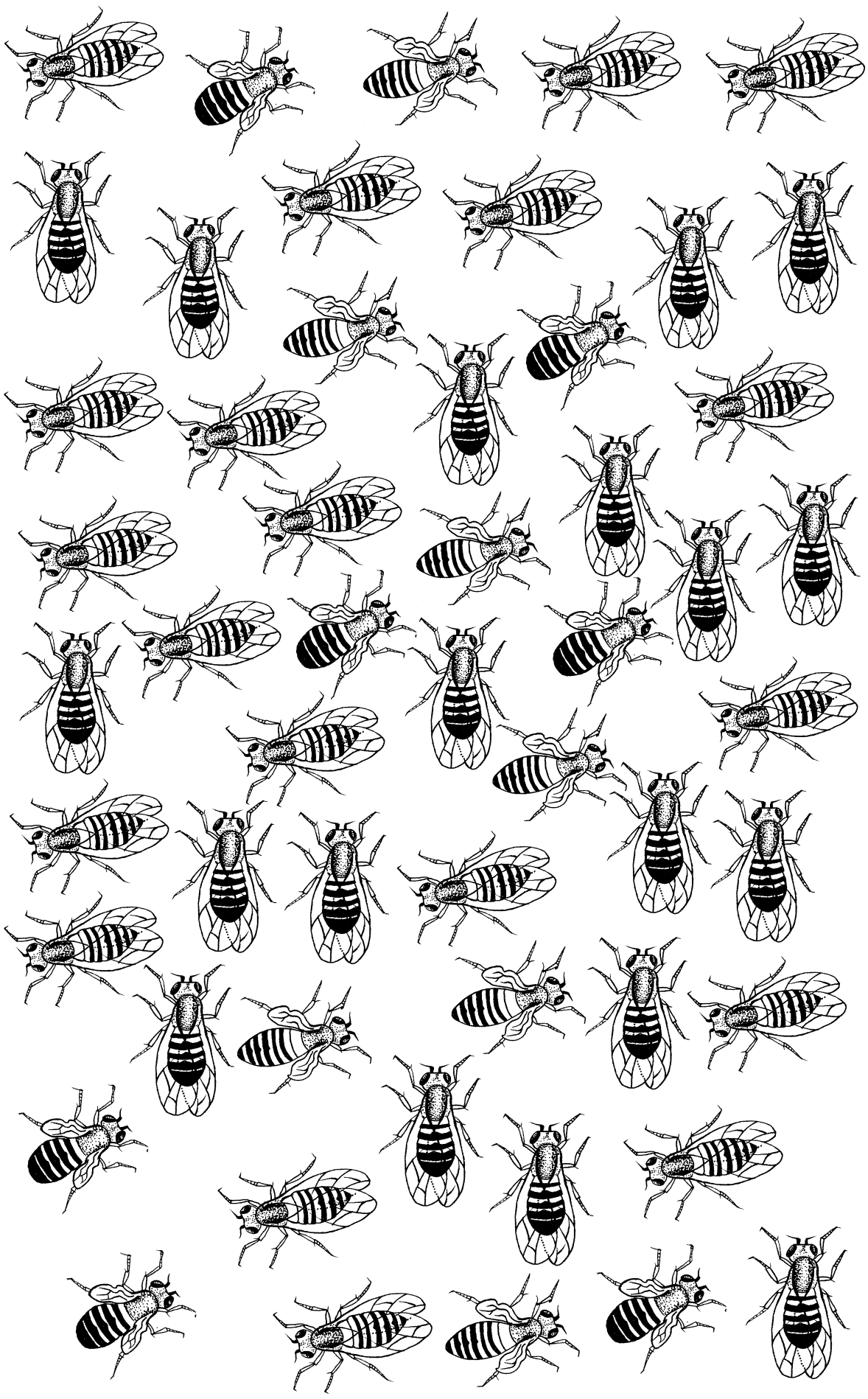

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(b) (i) Use the information from the table in part (a) to work out the total number of each of the following.

The total number of male flies is .....

The total number of female flies is .....

The total number of normal winged flies is .....

The total number of small winged flies is .....

(4)

(ii) Describe **one** pattern that you can see in these results.

.....

.....

.....

(2)

Q4

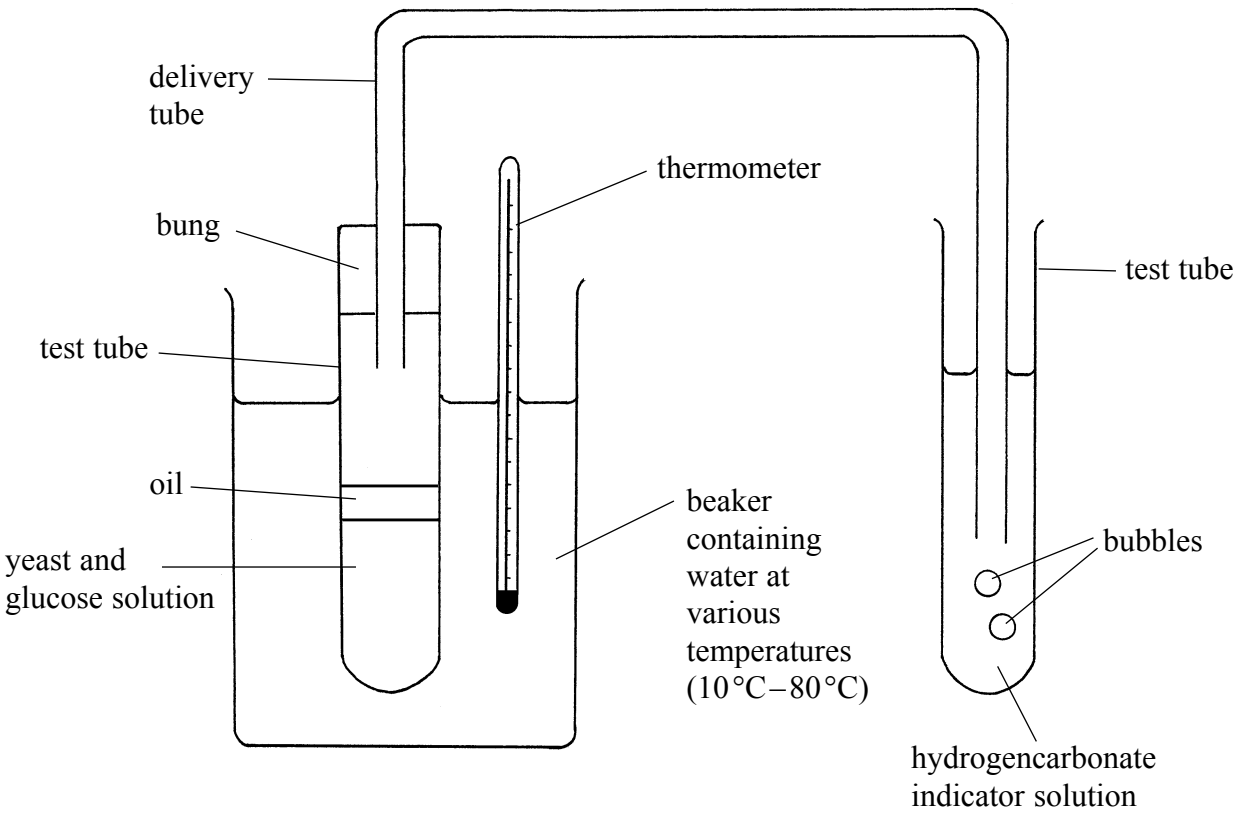
(Total 14 marks)

Leave blank

5. David carried out an investigation into the effect of temperature on anaerobic respiration in yeast. The only factor that he changed was the temperature of the reaction mixture. He was careful to control all other key factors that might affect the rate of respiration in yeast.

David predicted that the rate of respiration in yeast would increase as the temperature increased.

The apparatus he used is shown in the diagram.



David counted the bubbles of carbon dioxide being given off in one minute as the yeast respired.
He did this three times for each temperature he used.

(a) Why did David put oil on the surface of the yeast and glucose solution?

.....

(1)

(b) State **one** key factor that David should control and suggest how he might do this.

Factor .....

How controlled .....

.....

(2)

QUESTION 5 CONTINUES OVERLEAF

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(c) David put his results into a table.

Temperature in °C	**Number of bubbles of carbon dioxide released in one minute**			
	First count	Second count	Third count	Average
10	10	10	9	9.7
20	21	22	20	21.0
30	40	38	41	39.7
40	55	54	53	
50	60	65	64	63.0
60	54	52	30	45.3
70	31	30	29	30.0
80	0	0	0	0.0

(i) Calculate the average number of bubbles released in one minute at 40 °C. Write your answer in the empty box in the results table.

(1)

(ii) Using the results in the table, describe the effect of increasing the temperature on the rate of respiration in yeast.

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.....

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(2)

(iii) David had predicted that the rate of respiration in yeast would increase as the temperature increased. To what extent do his results support this prediction?

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(2)

Leave blank

(iv) Using your biological knowledge, explain the average result at 80 °C.

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.....

(2)

(d) Identify **one** anomalous (unexpected) result in David's table.

.....

.....

(1)

(e) (i) Suggest **one** way that this experiment could be modified to improve the reliability or accuracy of the results. Explain how your modification could improve the results.

Modification .....

.....

Explanation .....

.....

(2)

(ii) Suggest a further experiment David could carry out and explain how it would provide more information on the effect of temperature on respiration in yeast.

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.....

(2)

Q5

(Total 15 marks)

TURN OVER FOR QUESTION 6

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6. Describe how you could compare the population size of a plant growing in two different places. One place is on the side of a hill and the other place is on a piece of flat ground.

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Q6

(Total 4 marks)

TOTAL FOR PAPER: 50 MARKS

END