

Candidate Name _____

Centre Number

Candidate

Number

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UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
General Certificate of Education Ordinary Level

BIOLOGY

5090/6

PAPER 6 Alternative to Practical

MAY/JUNE SESSION 2000

1 hour

Candidates answer on the question paper.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Use a sharp pencil for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

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

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

- 1 Most fruit flies have normal wings, but some have small wings called vestigial wings. The gene for normal or vestigial wings is inherited from their parents. Two fruit flies with normal wings were crossed. The offspring that resulted from the cross are shown in Fig. 1.1

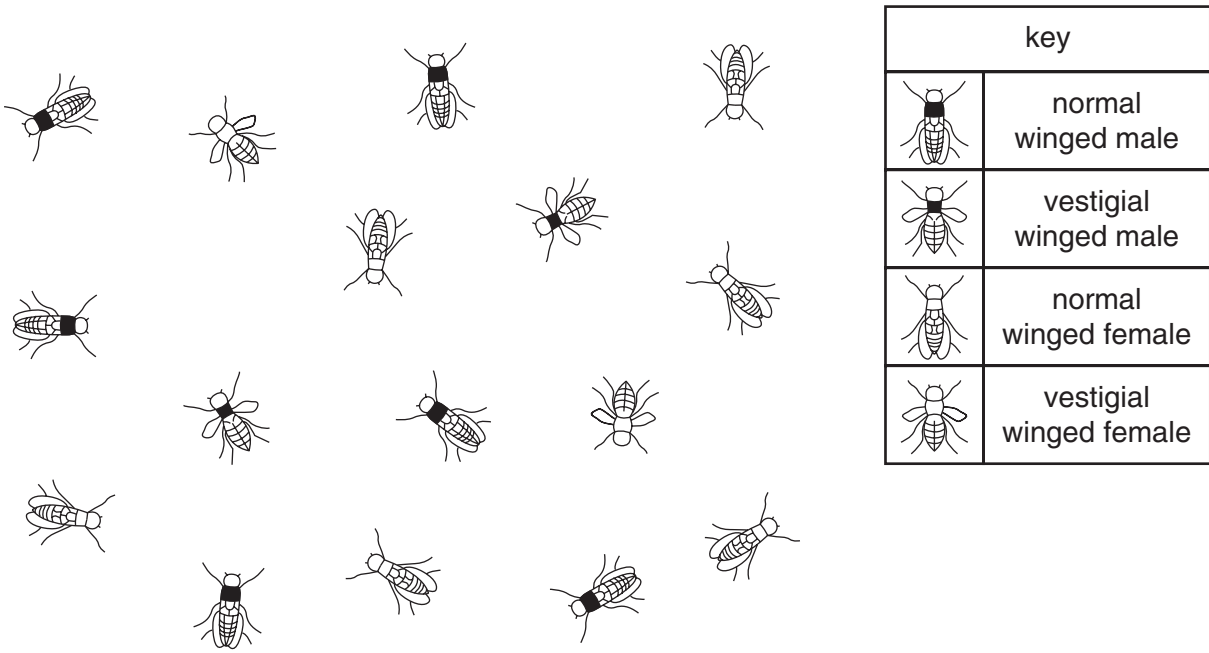


Fig. 1.1

- (a) (i) Complete Table 1.1.

Table 1.1

number of flies	
male	
female	
normal wing	
vestigial wing	

[2]

- (ii) Calculate the ratio of normal winged flies to vestigial winged flies.

Ratio[1]

(iii) State which wing condition, normal or vestigial, is dominant. Explain your answer.

Wing condition

Explanation

.....

[2]

(b) Draw a genetic diagram to show the cross.

Use **N** to represent the allele for normal wing and **n** to represent the allele for vestigial wing.

[4]

(c) Two vestigial winged flies were crossed.

Describe the possible appearance of the wings of the offspring. Explain your answer.

Appearance

Explanation

.....

.....[3]

[Total : 12]

- 2 Fig. 2.1 shows two bean seedlings, **A** and **B**. They have been germinating for the same length of time, but in different conditions.

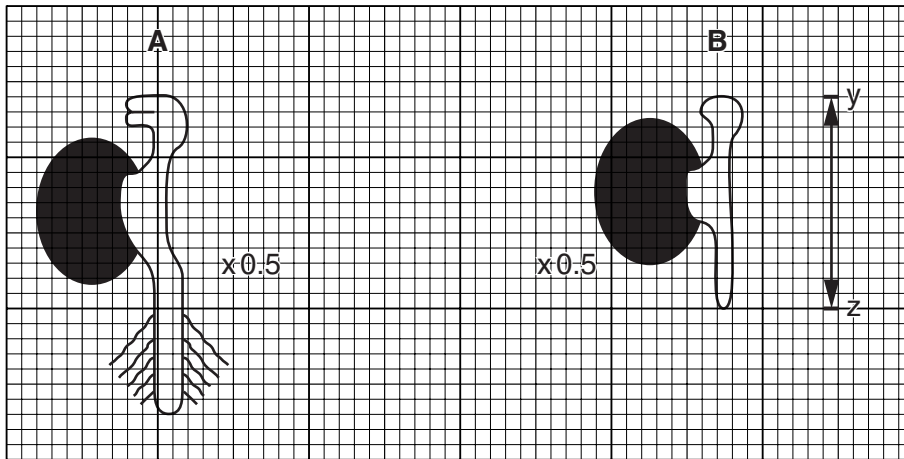


Fig. 2.1

- (a) (i) State **three** visible differences between the seedlings.

1.
2.
3.

- (ii) Suggest **three** possible causes of these differences.

1.
2.
3.

[3]

- (b) (i) Use a ruler to measure the length of the line between **Y** and **Z**.

Length

- (ii) Calculate the actual length of seedling **B**.

Length

[2]

- (c) (i) Find the total number of squares of graph paper covered by the shoot and root of each seedling. Ignore the root hairs.

Seedling **A**

Seedling **B**

- (ii) How much more growth has occurred in seedling **A** than in seedling **B**?

.....[3]

[Total : 8]

- 3 Fig. 3.1 shows part of the internal structure of the human eye.

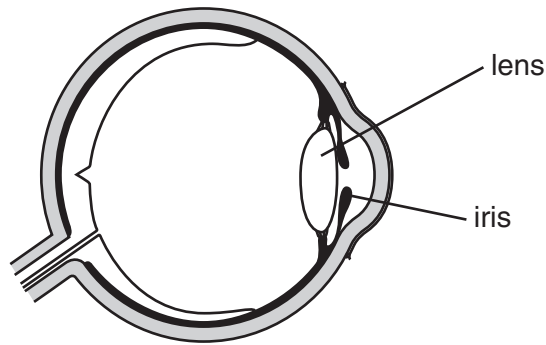
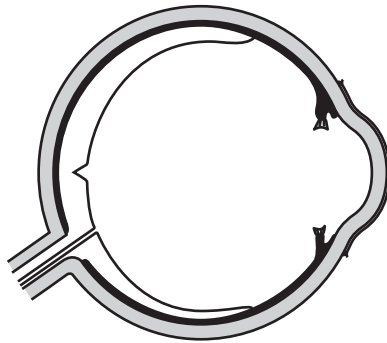


Fig. 3.1

- (a) On the following two diagrams, the lens and the iris are missing.

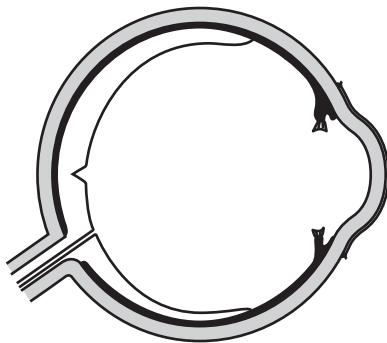
- (i) On Fig. 3.1a below, draw the iris to show how it would appear when the eye is receiving **less light** than the eye in Fig. 3.1.



[1]

Fig. 3.1a

- (ii) On Fig. 3.1b, draw the lens to show how it would appear when the eye is focused on an object **closer to the eye** than in Fig. 3.1.



[1]

Fig. 3.1b

- (b) Information from the eye is transmitted to the brain through the optic nerve. Fig. 3.2 shows an experiment carried out by a pupil on her nineteen classmates to determine how quickly they could react. The student held a ruler vertically so that its lower end was between the open thumb and index finger of a classmate. The classmate was instructed to catch the ruler by closing her thumb and index finger as soon as the student let go of the ruler.

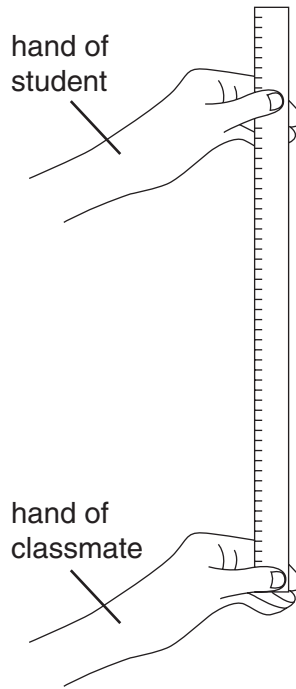


Fig. 3.2

The distance the ruler fell before being caught was recorded in Table 3.1.

Table 3.1

classmate	1	2	3	4	5	6	7	8	9	10
distance ruler fell (cm)	11	12	10	11	13	14	12	13	14	12

classmate	11	12	13	14	15	16	17	18	19
distance ruler fell (cm)	11	9	13	13	15	12	12	10	11

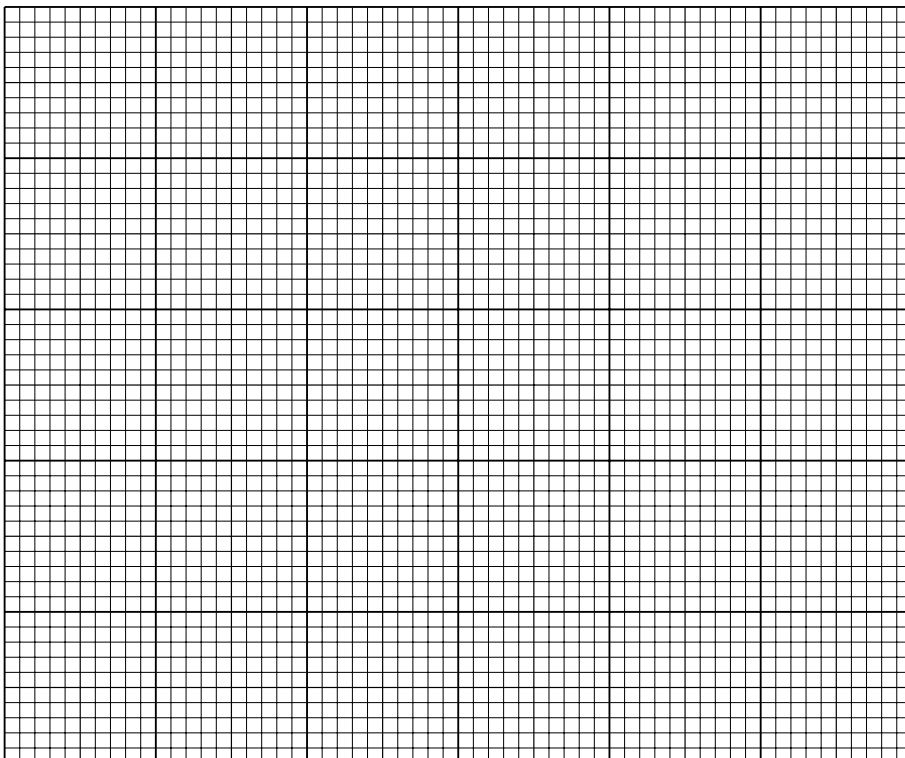
- (i) Complete Table 3.2 to show the number of classmates for each distance that the ruler fell.
The entry for 9 cm has been completed for you.

Table 3.2

distance ruler fell (cm)	number of classmates
9	1
10	
11	
12	
13	
14	
15	

[2]

- (ii) On the grid below, construct a bar chart to show the results of the experiment.



[4]

(iii) Suggest **one** factor that would slow down the classmates' reaction times.

.....[1]

(iv) State the effect of this factor on the shape of the chart.

.....[1]

(v) Explain why the classmates' reaction time would have been shorter if they had touched a hot object.

.....

.....

.....[2]

[Total : 12]

- 4 An experiment was carried out to investigate two washing powders, as shown in Fig. 4.1. Wizzo is a normal washing powder. Wizzo Plus is the same washing powder with an added enzyme.

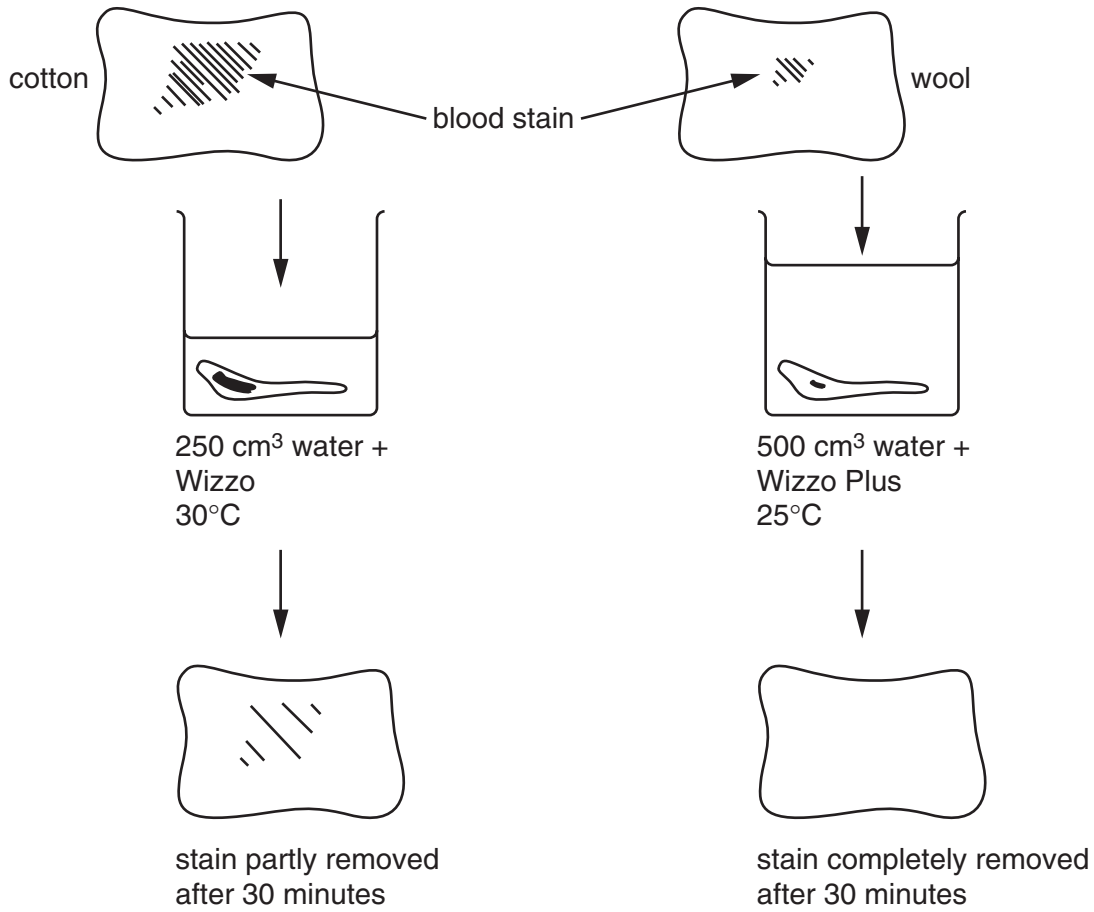


Fig. 4.1

- (a) Describe **four** ways in which this experiment could be improved to allow a fairer comparison of the two washing powders.

1.
2.
3.
4.

[4]

(b) The enzyme used in Wizzo Plus is a protein-digesting enzyme.
Describe how you would carry out an experiment to determine the optimum pH for this enzyme using the following materials.

a solution of the enzyme egg albumin (protein)
a range of pH solutions normal food test reagents
normal laboratory apparatus

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.....[4]

[Total : 8]

