

Candidate Name \_\_\_\_\_

Centre Number

Candidate  
Number

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**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
**General Certificate of Education Ordinary Level**

**BIOLOGY**

PAPER 6 Alternative to Practical

**5090/6**

**MAY/JUNE SESSION 2002**

1 hour

Candidates answer on the question paper.  
No additional materials are required.

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

**FOR EXAMINER'S USE**

1	
2	
3	
<b>TOTAL</b>	

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



- 1 Fig. 1.1 shows **some** of the pairs of chromosomes found in a human cell, including the chromosomes that determine sex. Each chromosome has been labelled with a letter.

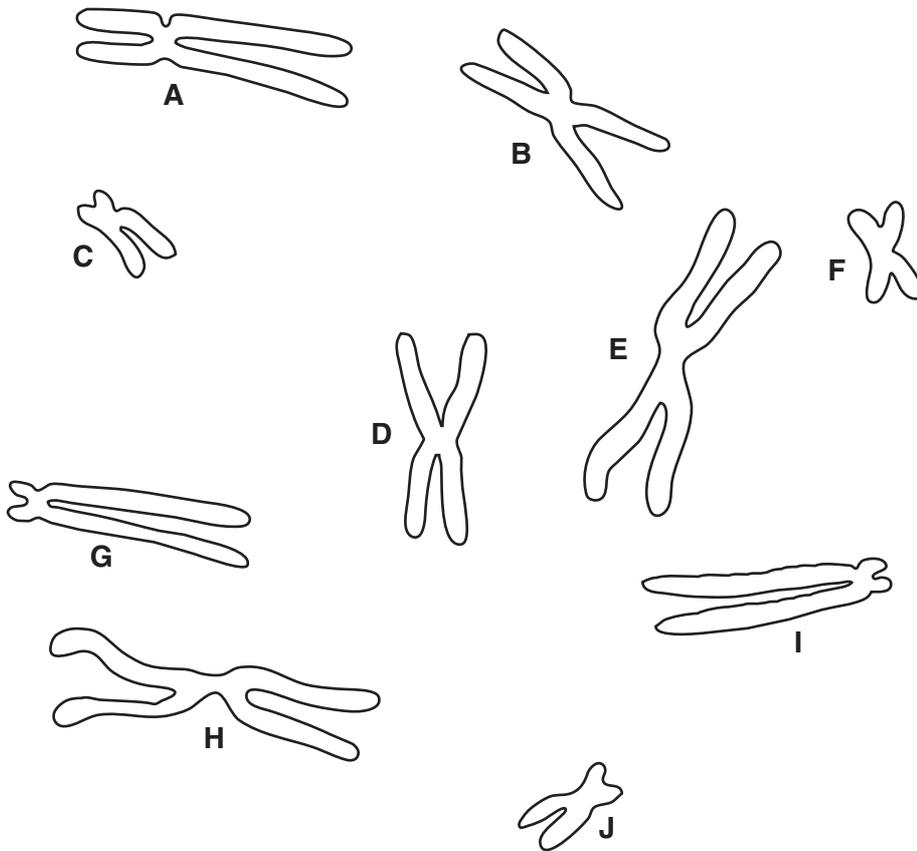


Fig. 1.1

- (a) (i) Complete the following table by listing in pairs, using the letters, those chromosomes that match each other.  
(You may cross out or circle chromosomes on Fig. 1.1 if this helps.)  
You will find one pair that does **not** match.

matching pairs of chromosomes	

[3]

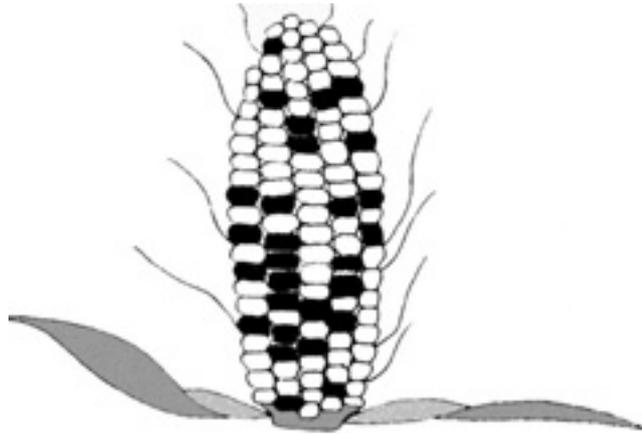
- (ii) Two of the chromosomes do **not** form a matching pair.

Complete the table and state what can be concluded about the phenotype of the person from whom the cell was taken.

non-matching pair of chromosomes	

..... [2]

Fig. 1.2 shows a cob of maize.



**Fig. 1.2**

**(b) (i)** Count the number of grains of each colour.

white .....

black ..... [2]

**(ii)** What genetic ratio do these figures suggest?

..... [1]

(c) **A** represents the allele for white colour and **a** represents the allele for black colour.

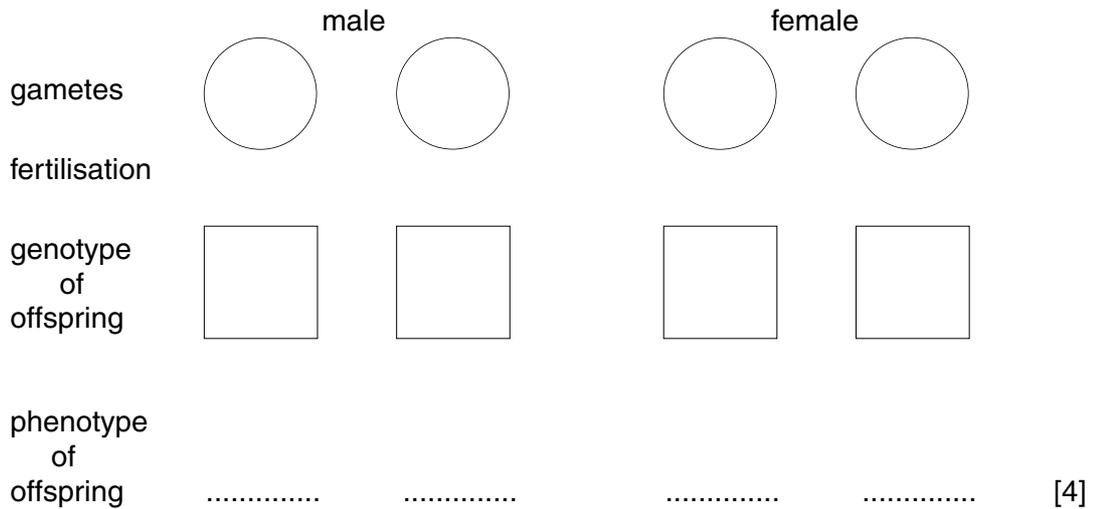
(i) What were the genotypes of the parent plants of this cob?

male parent .....

female parent .....

[1]

(ii) Complete the genetic diagram to show how the genetic ratio in (b)(ii) was produced.



(d) You are provided with **two** pure-breeding varieties of the same crop plant; one is resistant to weed-killer and the other is non-resistant.

Explain how you would carry out a genetic experiment to determine whether the resistance is dominant or recessive.

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..... [5]

[Total : 18]

2 Fig. 2.1 shows a sample of blood as seen under the high-power lens of a microscope.

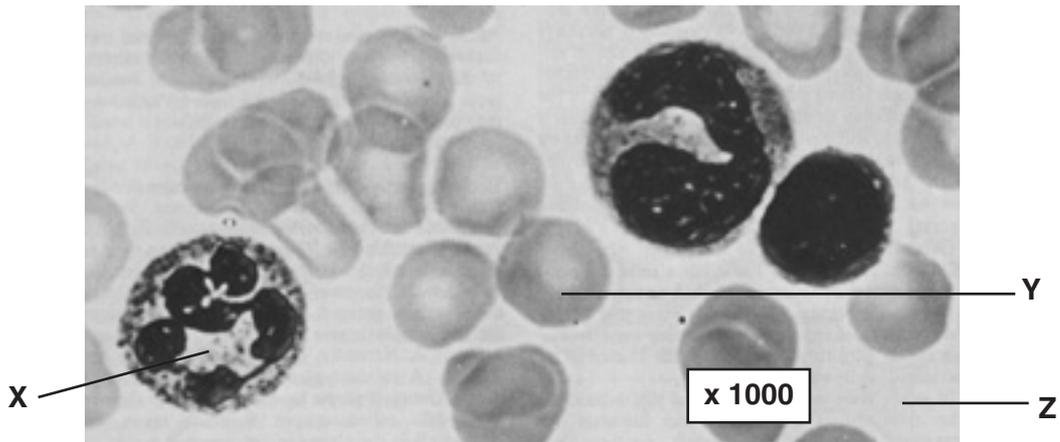


Fig. 2.1

(a) (i) Name X, Y and Z.

X .....

Y .....

Z .....

[2]

(ii) One other component of blood, normally visible, is missing from Fig. 2.1.

State its name and function.

*name* .....

*function* ..... [2]

(b) (i) In the space below, make a large, labelled drawing of cell X.

[5]

(ii) Measure the width of your drawing and the width of cell **X** in the photograph.

*width of drawing* .....

*width of cell X* ..... [1]

(iii) Calculate the magnification of your drawing.  
Show your working clearly.

*magnification* ..... [2]

[Total : 12]

- 3 Fig. 3.1 shows a photograph of the seed pod of a runner bean plant.



**Fig. 3.1**

A student collected seed pods from each of two different plants, plant **A** and plant **B**, and weighed them individually. The results are shown in Table 3.1.

**Table 3.1**

mass of seed pod / g	
pods from plant <b>A</b>	pods from plant <b>B</b>
20	22
19	24
17	19
18	23
21	22

- (a) (i) Calculate the average mass of the pods from each plant.

*plant A* .....

*plant B* .....

[2]

- (ii) Suggest two reasons, other than the use of fertiliser, why the average masses of the pods are different.

1. ....

.....

2. ....

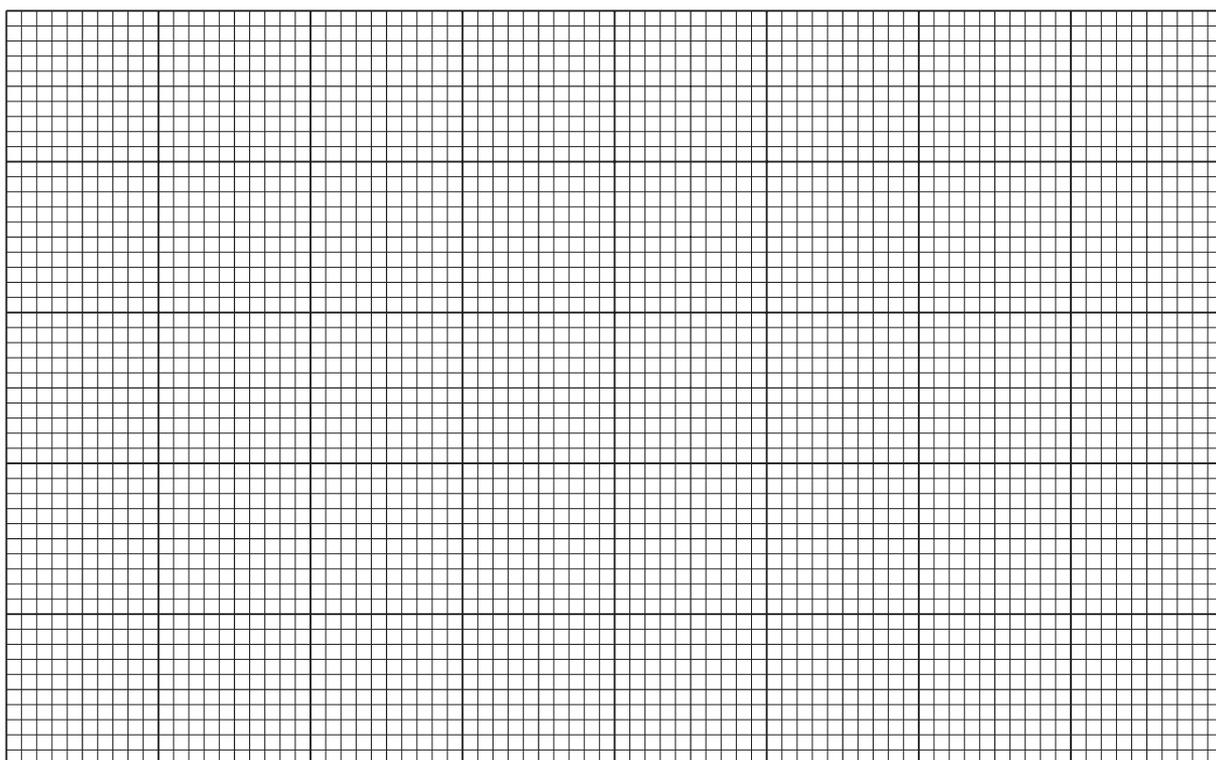
..... [2]

- (b) The student decided to find out what effect fertiliser had on the growth of seeds from the pods. He took the seeds from plant **B** and grew them in nine separate batches in a nutrient-free material called vermiculite. Each batch was watered with a different concentration of fertiliser. Twelve weeks after the seeds germinated, he harvested the crops of bean pods and weighed them. The results are shown in Table 3.2.

**Table 3.2**

concentration of fertiliser / arbitrary units	average mass of bean pods / g
0	13.5
1	17.8
2	20.6
3	23.2
4	26.5
5	29.6
6	31.5
7	30.1
8	28.5

- (i) Plot a graph of these figures on the grid below.



[4]

(ii) State the conclusions that can be drawn from these results.

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..... [2]

[Total : 10]



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*Copyright Acknowledgements:*

Question 2 Pauline Alderson and Martin Rowland. Micrograph of Blood from Biology for GCSE. MacMillan 1985. Reproduced with permission of Palgrave.

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