



General Certificate of Secondary Education  
2015

Centre Number

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Candidate Number

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# Biology

Unit 2

Foundation Tier

[GBY21]

MONDAY 15 JUNE, MORNING



\*GBY21\*

## TIME

1 hour 30 minutes.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page or on blank pages.**

Complete in blue or black ink only. **Do not write with a gel pen.**

Answer **all fourteen** questions.

## INFORMATION FOR CANDIDATES

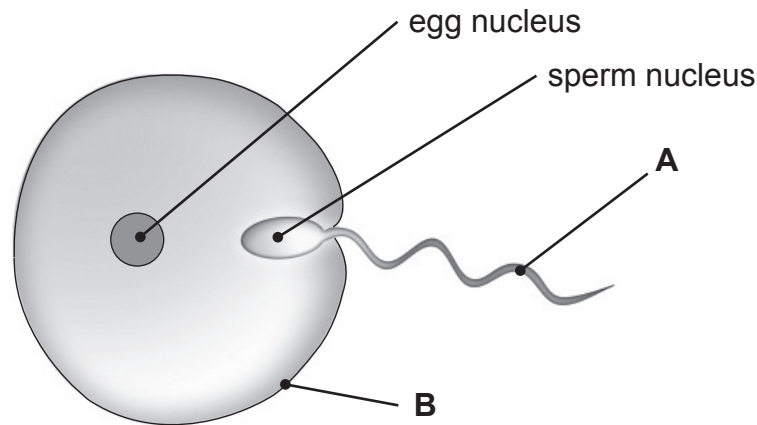
The total mark for this paper is 90.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **14**.



- 1 The diagram shows an egg and a sperm just before fertilisation.



© danielle71 / Thinkstock

Look at the diagram.

- (a) (i) Label parts **A** and **B**.

**A** \_\_\_\_\_ [1]

**B** \_\_\_\_\_ [1]

- (ii) What is the function of part **A**?

\_\_\_\_\_ [1]

- (b) In which part of the female reproductive system does fertilisation take place?

\_\_\_\_\_ [1]

- (c) Name the cell produced by fertilisation.

Put a circle around the correct answer.

foetus

zygote

embryo

[1]



2 Diseases caused by microorganisms are spread and prevented in different ways.

**Draw lines** to link each type of microorganism to **one** correct statement about it.

Type of microorganism

Statement about microorganisms

Cause of rubella

Cold virus

Prevented by cooking food thoroughly

Salmonella

Cause of athlete's foot

Fungus

Spread by droplet infection

HIV

Prevented by vaccination

Spread by sharing dirty needles or  
sexual intercourse

[4]

[Turn over



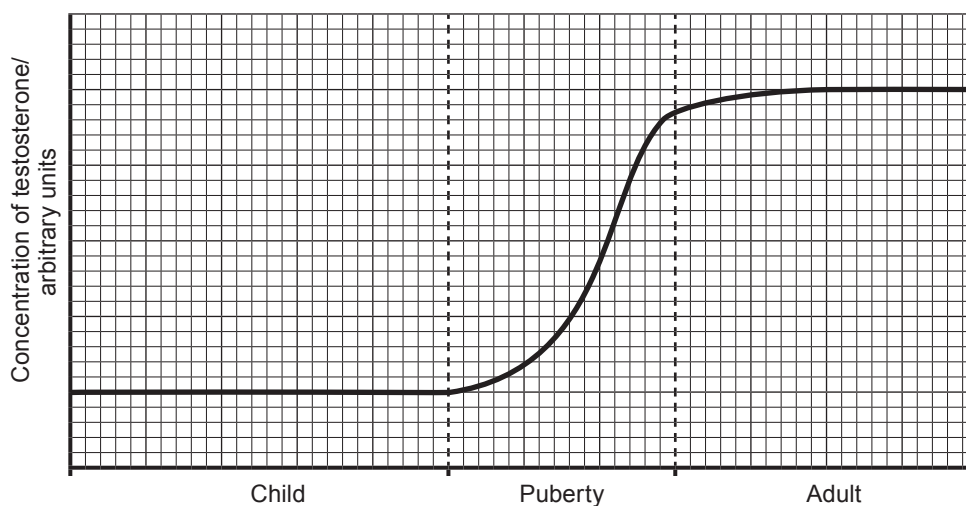
3 Testosterone is a sex hormone found in males.

(a) Name the organ that produces testosterone.

\_\_\_\_\_

[1]

(b) The graph shows changes in the concentration of testosterone in a male.



© CCEA

Look at the graph.

(i) Describe the changes in the concentration of testosterone.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[3]

(ii) During puberty testosterone brings about changes in a male's body.

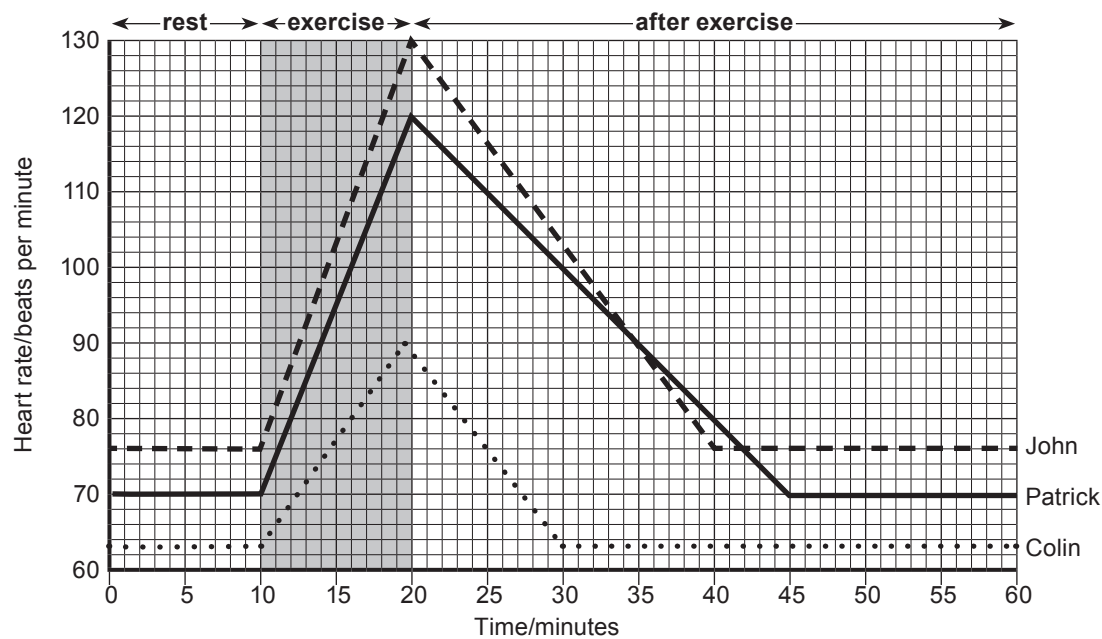
Describe **one** way the male body changes during puberty.

\_\_\_\_\_  
\_\_\_\_\_

[1]



4 The graph shows the heart rate of three men before, during and after exercise.



© CCEA

Look at the graph.

The recovery time is the time taken for the heart to return to its resting rate after exercise.

The recovery time for John is 20 minutes.

(a) What is the recovery time for Patrick?

\_\_\_\_\_ minutes [1]

(b) One of the men exercises regularly.

(i) Name this man.

\_\_\_\_\_

[1]

(ii) Give **two** pieces of evidence from the graph to support your answer.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

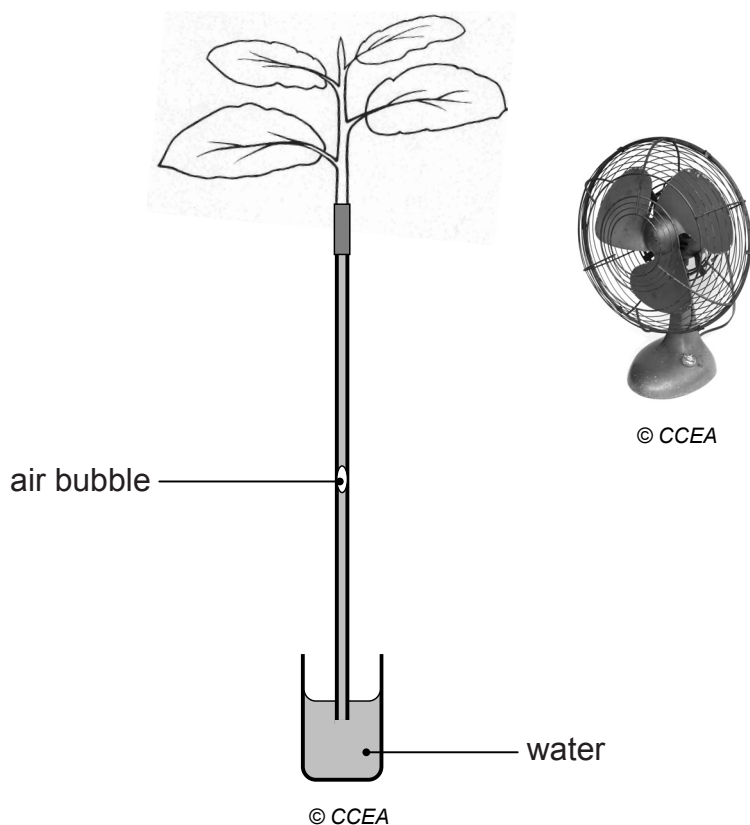
\_\_\_\_\_

[2]

[Turn over]



- 5 The diagram shows a simple potometer at the start of an experiment.



- (a) The potometer was left for 30 minutes in front of a fan.

- (i) What would happen to the air bubble during this time?

\_\_\_\_\_  
\_\_\_\_\_ [1]

- (ii) Explain what causes this change.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

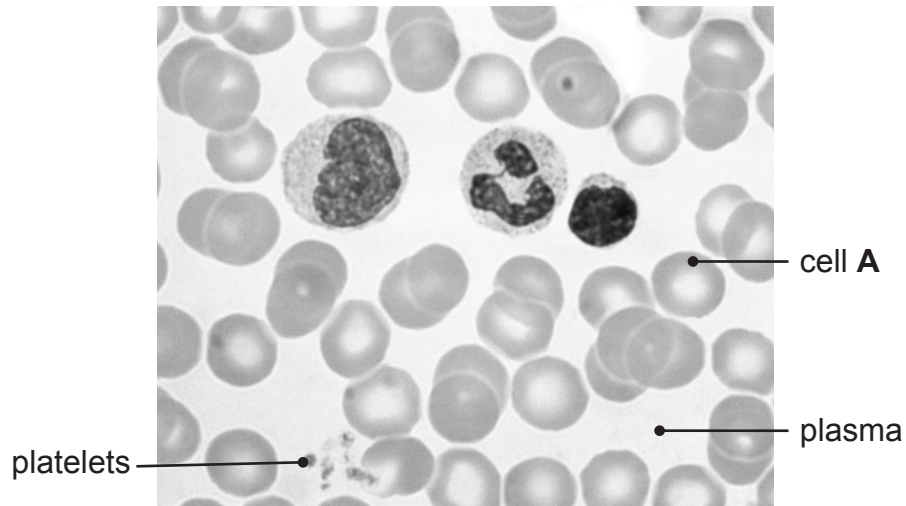
- (b) Give **two other** ways plants use water.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]



6 The photograph shows a blood smear.



© Biophoto Associates / Science Photo Library

Look at the photograph.

(a) Cell **A** is adapted to carry oxygen.

(i) Name cell **A**.

\_\_\_\_\_ [1]

(ii) Describe **two** ways it is adapted to carry oxygen.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

(b) Name **two** substances transported in blood plasma.

1. \_\_\_\_\_ [1]

2. \_\_\_\_\_ [1]

(c) Platelets are shown in the photograph.

Give the function of platelets.

\_\_\_\_\_ [1]

[Turn over]



7 Wild rabbits have brown fur.

Albino rabbits have white fur.

brown rabbit



© Colin Varndell / Science Photo Library

white rabbit



© Vladimir Yakush / iStock / Thinkstock

Brown fur is controlled by a dominant allele **B**.

White fur is controlled by a recessive allele **b**.

(a) What is an allele?

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[1]





**(b)** The diagram shows a cross between a brown rabbit and a white rabbit.

Parents	brown
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x

white

## Genotypes

**Bb**

## Gametes

# B

**b**

x

**b**

Offspring

		<b>White</b>
		b
<b>Brown</b>	B	Bb
	b	bb

- (i) Complete the diagram by adding the genotype of the white parent. [1]

- (ii)** What term is used to describe the genotype of the brown parent?

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- (iii)** Name the grid used to work out the genotypes of the offspring.

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- (iv)** What is the ratio of genotypes in the offspring?

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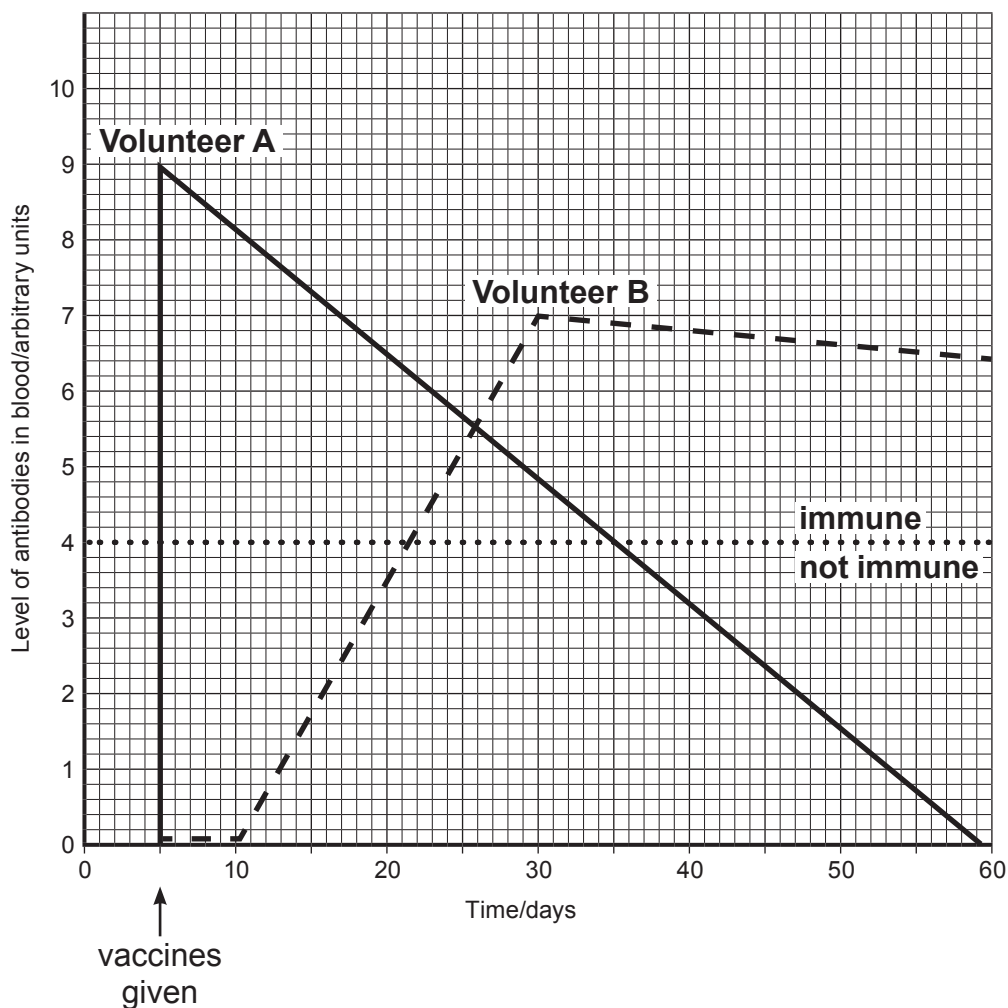
**[Turn over**



- 8 Two volunteers were going abroad to help the victims of a disaster.

Before leaving they had to be vaccinated against a serious disease found in the disaster area.

The graph shows the level of antibodies in their blood before and after the vaccinations.



- (a) What is an antibody?

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[2]



(b) What was the antibody concentration in the blood of each volunteer on day 40?

Volunteer **A** \_\_\_\_\_ arbitrary units.

Volunteer **B** \_\_\_\_\_ arbitrary units. [2]

(c) Volunteer **A** was advised to return home by day 35.

Explain why.

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[2]

(d) Volunteer **B** was given a vaccination to bring about active immunity.

(i) What is active immunity?

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[1]

(ii) Give **two** pieces of evidence from the graph which suggests that the vaccination given to volunteer **B** brought about active immunity.

1. \_\_\_\_\_

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[1]

2. \_\_\_\_\_

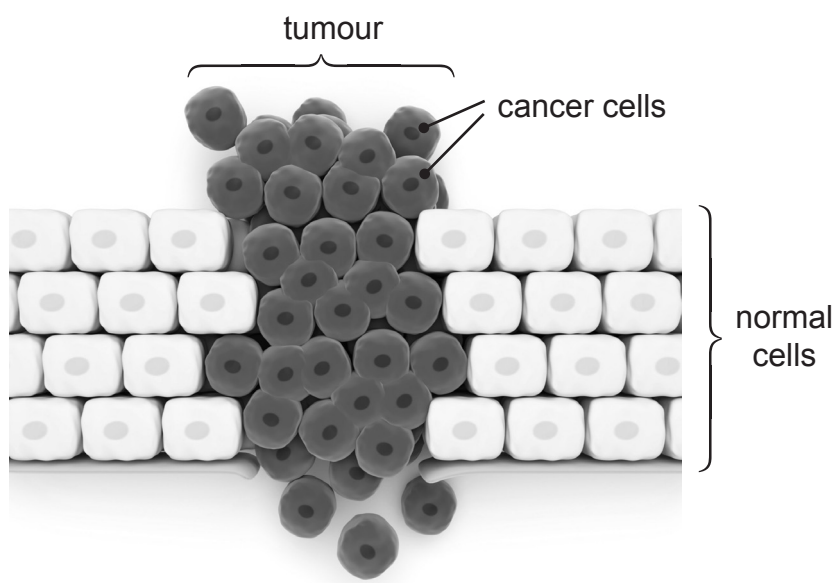
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[1]

[Turn over]



- 9 (a) The diagram shows cancer cells in a tumour.



© Somersault18:24/ iStock/ Thinkstock

- (i) What is cancer?

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[2]

Look at the diagram.

- (ii) Give **one** piece of evidence, from the diagram, which suggests this tumour is malignant.

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[1]



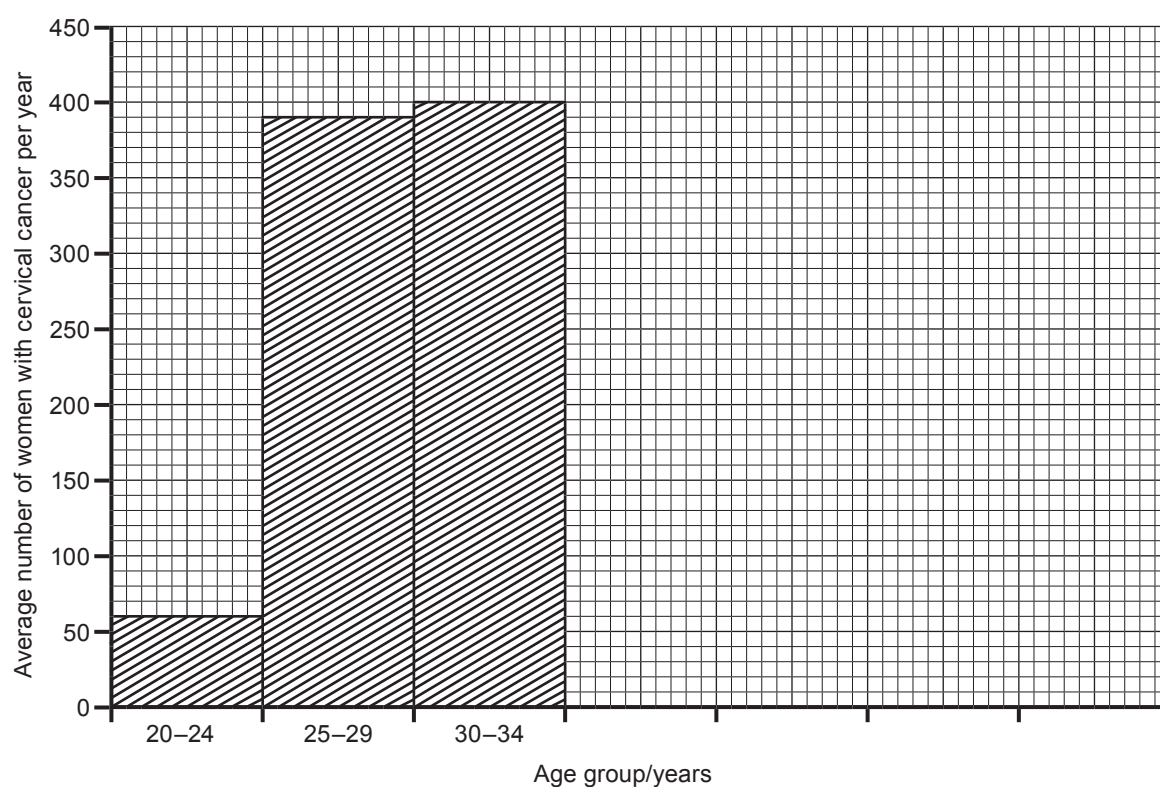
- (b) The number of women in the UK diagnosed with cervical cancer was recorded over a three year period and the average number per year was calculated.

The table shows the average number of women in each age group with cervical cancer.

Age group/ years	Average number of women with cervical cancer per year
20–24	60
25–29	390
30–34	400
35–39	430
40–44	360
45–49	270
50–54	190

- (i) **Complete the histogram** using the results in the table.

Shade the bars you have drawn.



[3]

[Turn over]



All women in the UK between the ages of 25 and 54 are screened for cervical cancer.

- (ii) Suggest **one** reason why women below the age of 24 are **not** included in all screening programmes.

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[1]

- (iii) Explain why screening programmes are important.

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[2]



10 (a) Sterilisation is a reliable method of contraception in women.

(i) Explain why sterilisation in women is reliable.

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[2]

(ii) Give **one other** advantage of sterilisation as a method of contraception.

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[1]

(b) A condom is another method of contraception.

(i) Describe how condoms prevent pregnancy.

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[2]

(ii) Give **one** health advantage of using a condom.

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[1]

[Turn over



11 Cigarette smoke contains nicotine.

The concentration of nicotine in the air is a measure of the total number of cigarettes being smoked.

The table shows the concentration of nicotine in 50 pubs before and after a smoking ban.

Concentration of nicotine in the air/ arbitrary units	Number of pubs	
	Before ban	After ban
0–100	0	44
101–200	1	6
201–300	3	0
301–400	20	0
401–500	26	0

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(a) Describe the effect of the smoking ban on the concentration of nicotine in pubs.

Use data from the table to support your answer.

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[3]

(b) Give **two** ways nicotine affects the body.

1. 

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2. 

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[2]





- (c) Suggest **two other** substances in cigarette smoke that could be used to measure the impact of a smoking ban.

Explain the effect of each substance on the body.

1. Substance \_\_\_\_\_ [1]

Explanation \_\_\_\_\_

\_\_\_\_\_ [1]

2. Substance \_\_\_\_\_ [1]

Explanation \_\_\_\_\_

\_\_\_\_\_ [1]

- (d) Suggest **one** reason why some people object to a smoking ban.

\_\_\_\_\_

\_\_\_\_\_ [1]

[Turn over



12 Height is an example of variation.

(a) Name the type of variation shown by height.

\_\_\_\_\_

[1]

(b) The heights of 10 pupils in a class of 26 were measured to the nearest centimetre.

The results are shown.

~~162~~ ~~156~~ ~~160~~ 172 168 169 165 178 166 168

(i) **Complete the tally chart** for these results.

The first three have been done for you.

Height/cm	Tally	Number of pupils
155–159	I	1
160–164	II	2
165–169		
170–174		
175–179		

[2]

(ii) Suggest which type of graph should be used to present these results.

Put a circle around the correct answer.

bar chart

histogram

pie chart

[1]

(iii) What percentage of pupils were less than 165 cm tall?

Show your working.

\_\_\_\_\_ % [2]



(iv) Suggest why this percentage may not be reliable.

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[1]

(c) (i) Height may be affected by a number of environmental factors.  
Suggest one.

---

[1]

(ii) Give **one** cause, other than environmental, of variation in height.

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[1]



13 During pregnancy the baby can be screened for chromosome abnormalities.

Cells from the baby are removed and allowed to divide. During the cell division the chromosomes are photographed.

(a) Name this type of screening test.

\_\_\_\_\_

[1]

(b) Name the part of the cell where chromosomes are found.

\_\_\_\_\_

[1]

The photographs show the chromosomes of two babies.



©Leonard Lessin / Science Photo Library



©Leonard Lessin / Science Photo Library



Baby **B** suffers from a chromosome abnormality.

(c) Name the condition caused by this chromosome abnormality.

\_\_\_\_\_ [1]

(d) What term describes the random change that causes chromosome abnormalities?

\_\_\_\_\_ [1]

Identical twins have identical sets of chromosomes.

(e) Give **one** piece of evidence from the photographs to explain why baby **A** and baby **B** are **not** identical.

\_\_\_\_\_ [1]

(f) Give **two** ethical issues that may arise because of this screening test.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

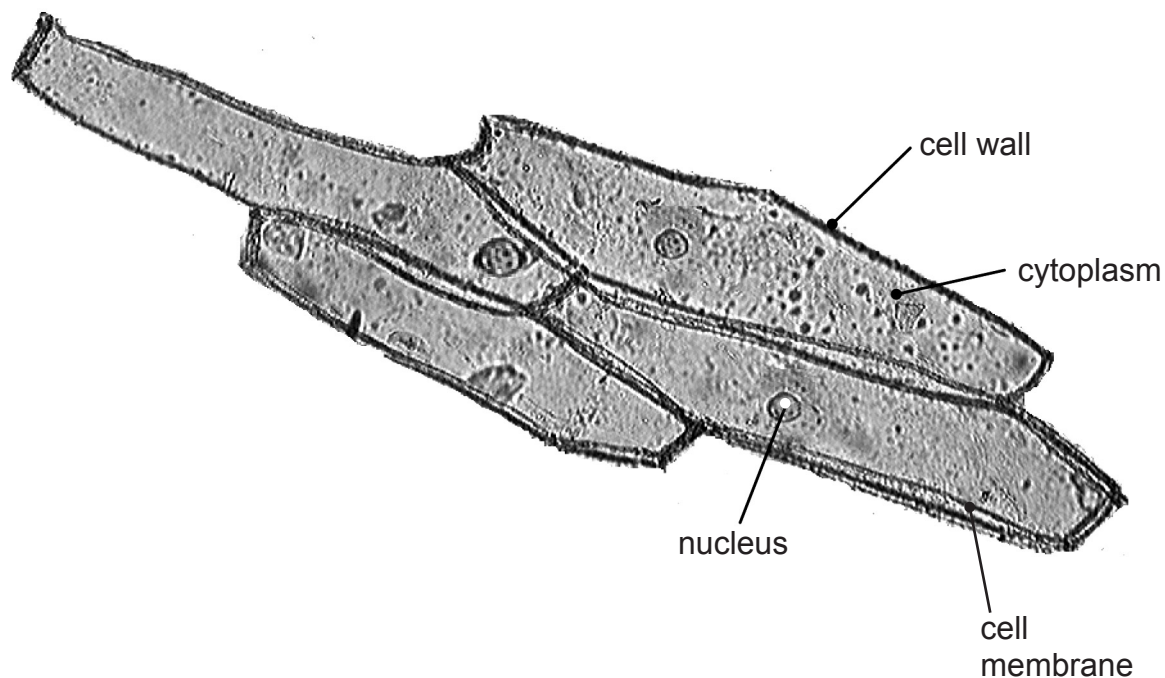
[Turn over



14 Onion tissue was moved from water into a concentrated sugar solution.

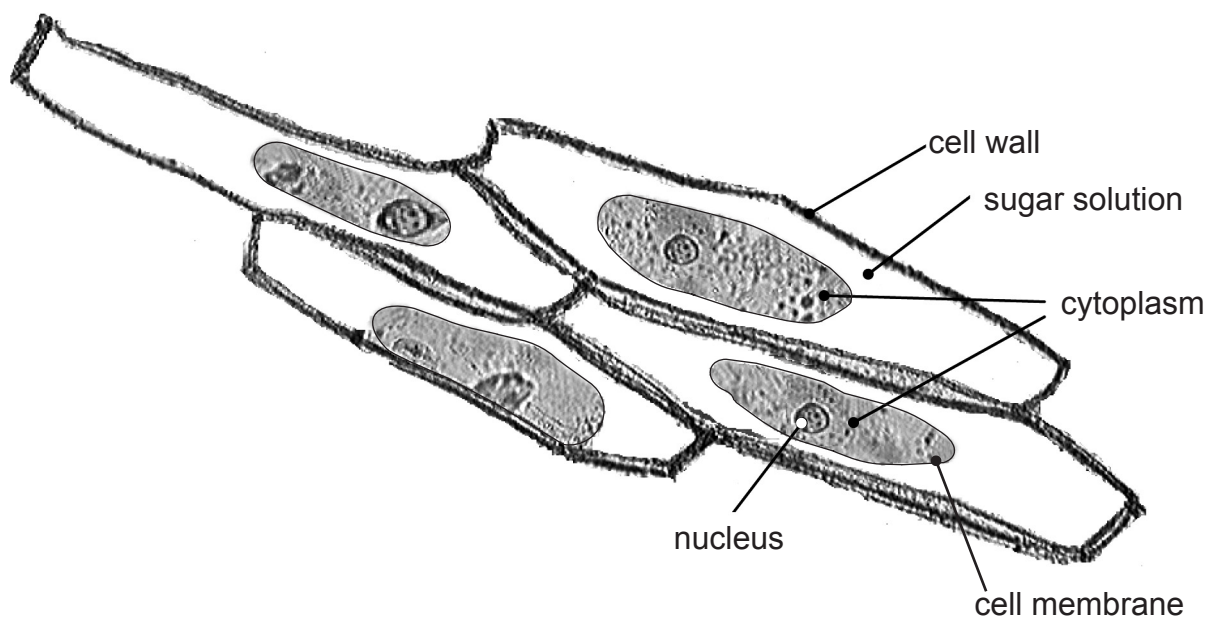
The photographs show cells of the onion tissue in each solution.

Onion cells placed in water



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Onion cells placed in concentrated sugar solution



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[6]



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Question Number	Marks
1	
2	
3	
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13	
14	

Total Marks	
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Examiner Number

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