Write your name here

Surname	Other names

Pearson Edexcel Certificate
Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Unit: KBI0/4BI0
Science (Double Award) KSC0/4SC0
Paper: 1B

Tuesday 12 May 2015 – Afternoon
Time: 2 hours

Paper Reference
KBI0/1B 4BI0/1B
KSC0/1B 4SC0/1B

You must have:
Ruler
Calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Show all the steps in any calculations and state the units.

Information

- The total mark for this paper is 120.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P44258A

©2015 Pearson Education Ltd.

1/1/1/1/1/

P 4 4 2 5 8 A 0 1 3 2

PEARSON

BLANK PAGE

Answer ALL questions.

1 Living organisms share some basic characteristics.

Draw a straight line from each characteristic to its correct description.

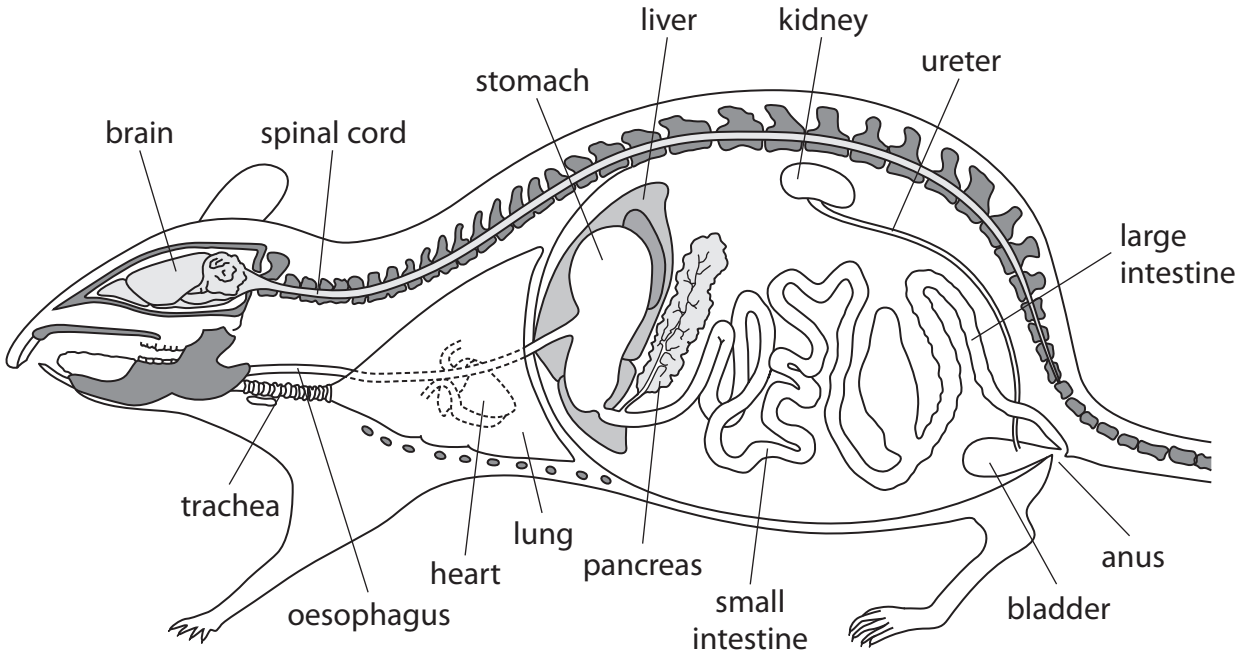
The first has been done for you.

(4)

Characteristic	**Description**
sensitivity	production of new organisms
respiration	respond to the surroundings
excretion	taking in of food
reproduction	increase in number of cells
growth	release of energy in cells
nutrition	removal of metabolic waste

(Total for Question 1 = 4 marks)

2 The diagram shows a section through a rat. Some of the rat's organs have been labelled.



(a) (i) What is meant by the term **organ**?

(1)

.....

.....

(ii) Name the organ labelled in the diagram that is part of the circulation system.

(1)

.....

(iii) Name three other systems shown in the diagram.

(3)

1 .....

2 .....

3 .....

(iv) Name a system that is **not** shown in the diagram.

(1)

.....

(b) The table lists several processes that take place in the organs of a rat.

Complete the table by naming the correct organ for each process.

(5)

Process	Organ
ultrafiltration	
ventilation	
insulin secretion	
hydrochloric acid secretion	
bile production	

(Total for Question 2 = 11 marks)

3 The photograph shows a breed of dog called a Border Collie.



©Robb

Border Collies can inherit an eye defect called CEA (Collie Eye Anomaly).

The dominant allele D produces good vision but the recessive allele d produces poor vision.

(a) The diagram shows the possible offspring from parents with different genotypes.

	Parents		Offspring
cross P		+	=
cross Q		+	=
cross R		+	=
cross S		+	=
cross T		+	=
cross U		+	=

Key

homozygous dominant	(DD)	
homozygous recessive	(dd)	
heterozygous	(Dd)	

(i) All the offspring from cross R have good vision.

Give the letters of the other crosses where all the offspring have good vision.

(2)

.....

(ii) Give the phenotype of each parent used in cross P.

(1)

.....

(iii) Which cross has a 50% probability of producing offspring with good vision?

(1)

.....

(iv) Give the genotype of each of the offspring produced in cross T.

(1)

.....

(b) The crosses between the dogs are examples of sexual reproduction.

(i) Name the gametes produced by males in sexual reproduction.

(1)

.....

(ii) Name the gametes produced by females in sexual reproduction.

(1)

.....

(iii) Give the term used to describe the fusion of gametes.

(1)

.....

(iv) In which organ of a female parent do offspring develop?

(1)

.....

(Total for Question 3 = 9 marks)

4 This warning appears on the side of a cigarette packet.

Smoking seriously damages your health and those around you

(a) Describe how smoking damages the lungs.

(5)

(b) If a pregnant woman smokes cigarettes it will increase the risk of her producing a smaller baby. This is because cigarette smoke contains carbon monoxide.

Suggest how carbon monoxide will increase the risk of producing a smaller baby.

(3)

(Total for Question 4 = 8 marks)

5 (a) A student is given two samples of carbohydrates.

He tests to see if one is glucose and the other one is starch.

Describe the two chemical tests he should use to identify each carbohydrate.

(4)

(b) Different groups of organism store carbohydrate as different molecules.

Complete the table to show an example from each group of organisms and the molecule they use to store carbohydrate.

(4)

Group	Example from the group	Molecule used to store carbohydrate
animals	cat	
plants	maize	
fungi		

(Total for Question 5 = 8 marks)

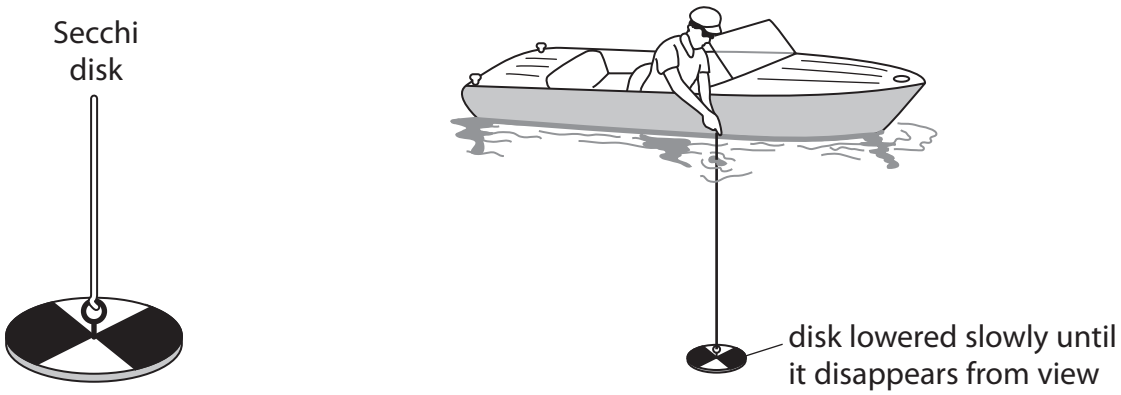
BLANK PAGE

6 Water in lakes can become polluted if too much phosphate is leached from the soil. The polluted water becomes very cloudy because of the growth of lots of microscopic plants called algae.

It is possible to find out how polluted water is by using a black and white disk called a Secchi disk. The following technique is used.

- the disk is lowered into the water using a rope
- the disk is lowered into the water until it can no longer be seen
- the depth when the disk is no longer seen is measured

The diagrams show a Secchi disk and the way in which it is used.



Scientists used Secchi disks to test the pollution level of four lakes.

The table shows the results.

Lake	Depth at which Secchi disk can no longer be seen in metres
A	7.0
B	3.9
C	3.3
D	4.4

(a) They concluded that lake C was the most polluted with phosphate.

Suggest two reasons why this conclusion may **not** be correct.

(2)

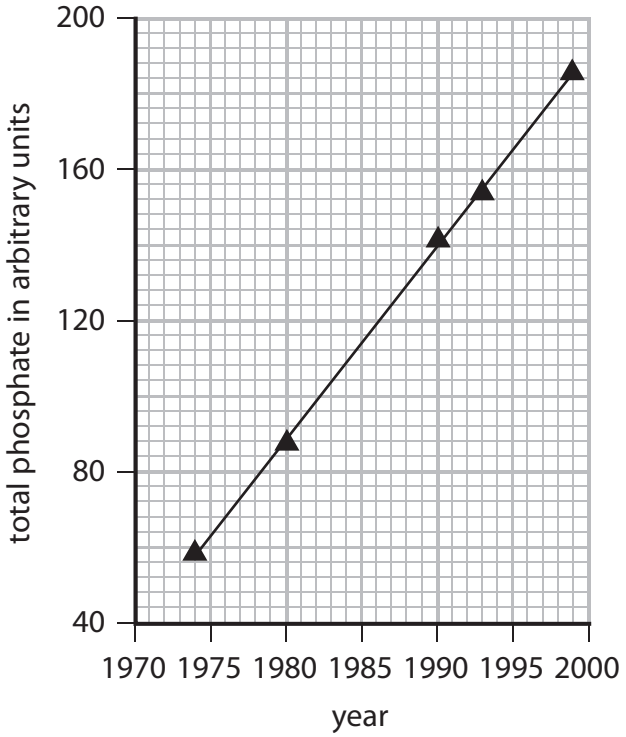
1 .....

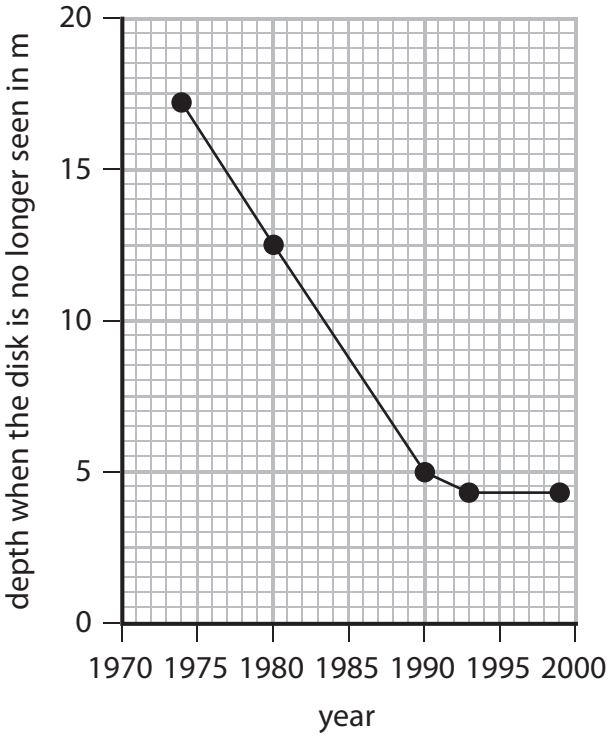
.....

2 .....

.....

(b) The graph shows changes in the level of phosphate and Secchi depth measurements, for one of the lakes over a 25-year period.





(i) Using both graphs, describe the relationship between phosphate levels and Secchi depth.

(2)

(ii) The number of fish in the lake decreases over the 25-year period.

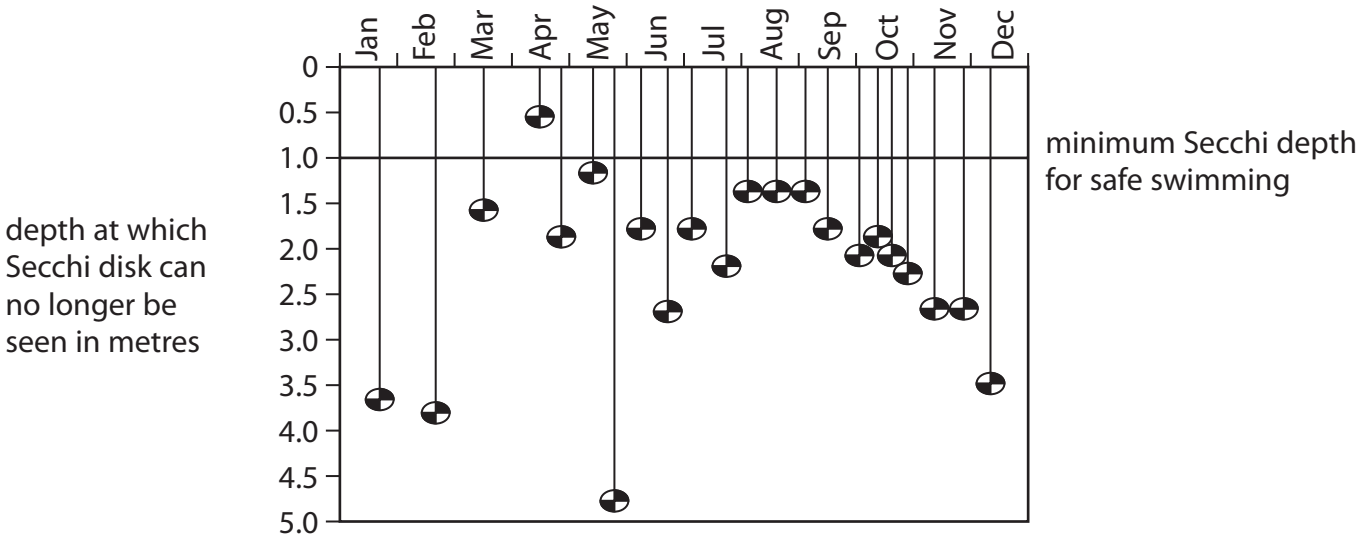
Explain how the changes in phosphate levels might cause the decrease in the number of fish.

(5)

(c) Seawater is sometimes polluted by raw sewage. This water also becomes cloudy and is not safe for humans to swim in.

A scientist used Secchi disks to measure pollution in seawater at a beach during a year.

The graph shows the depth at which he could no longer see the Secchi disk.



(i) How many times during the year was the Secchi disk used to measure pollution?

(1)

.....

(ii) In which month were most depth measurements taken?

(1)

.....

(d) Water may not be safe for swimming in at this beach.

The scientist concluded that the only month when the water was not safe for swimming was April.

(i) Give a reason to support this conclusion.

(1)

.....

.....

(ii) Suggest a reason to reject this conclusion.

(1)

.....

.....

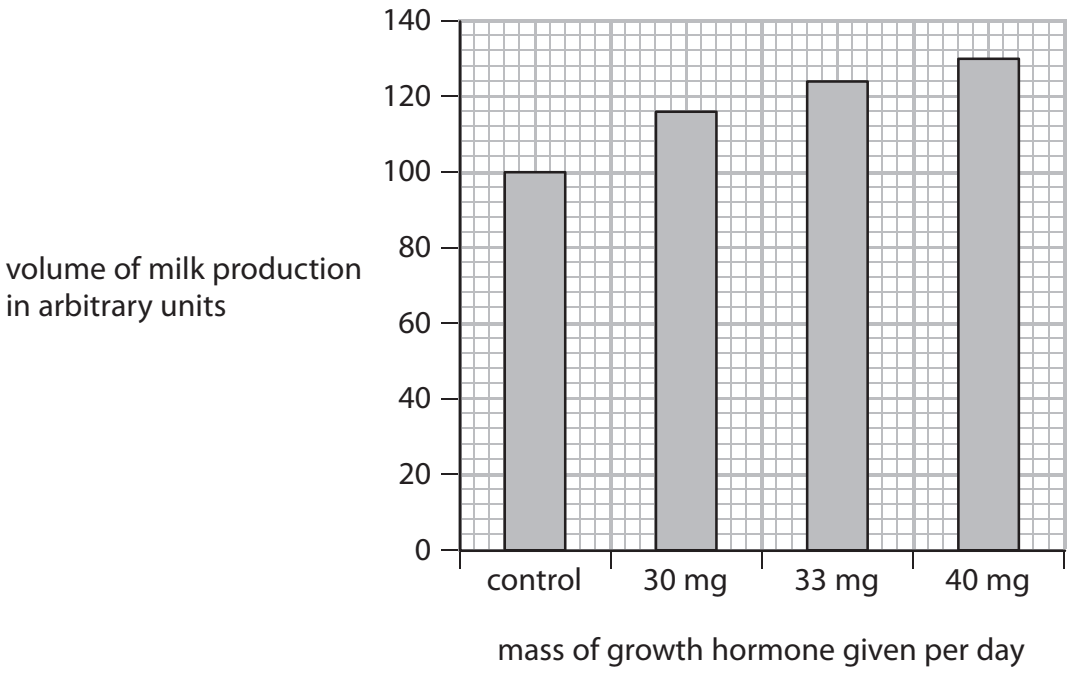
(Total for Question 6 = 13 marks)

7 An investigation was carried out to find out the effect of a growth hormone on milk production.

Groups of cows were given different masses of a growth hormone.

The volume of milk the cows produced was then measured.

The graph shows the results.



(a) (i) How much growth hormone should have been given to the control group?

(1)

.....

(ii) Describe the effect of growth hormone on milk production.

(1)

.....

.....

(b) Farmers want to make reliable comparisons about the effect of different doses of growth hormone.

(i) What was done in this investigation to make the results reliable?

(1)

.....

(ii) Many variables that affect milk production need to be kept the same for each group of cows. This allows a valid comparison to be made between each group.

Give two variables that need to be kept the same.

(2)

1 .....

2 .....

(c) Growth hormone is a protein.

It might be present in the milk produced by the cows and then be consumed by humans.

Some people are worried that this may harm humans.

Other people say that this is not a problem for two reasons.

Firstly, the milk is pasteurised (heated to high temperatures).

Secondly, the growth hormone is destroyed in the human stomach.

(i) Suggest what happens to the growth hormone when milk is pasteurised.

(1)

.....

.....

.....

(ii) Describe how the growth hormone could be destroyed in the stomach.

(3)

.....

.....

.....

.....

.....

.....

(d) The growth hormone used in this investigation was obtained from genetically modified bacteria.

Describe how bacteria can be genetically modified and used to produce growth hormone.

(4)

(Total for Question 7 = 13 marks)

BLANK PAGE

8 The data shows the number of heart attacks in men and women of different ages from 1969 to 1998 in one area in England.

Year	Number of heart attacks per 100 000 people	
	Men aged 40–44	Women aged 40–44
1969–73	125	13
1974–78	135	15
1979–83	116	11
1984–88	86	6
1989–93	68	9
1994–98	48	9

(a) Plot a bar graph to show the data in the table.

(6)



(b) Describe how the data differs for men and women.

(2)

(c) Give an explanation for the change in the number of heart attacks from 1969 to 1998.

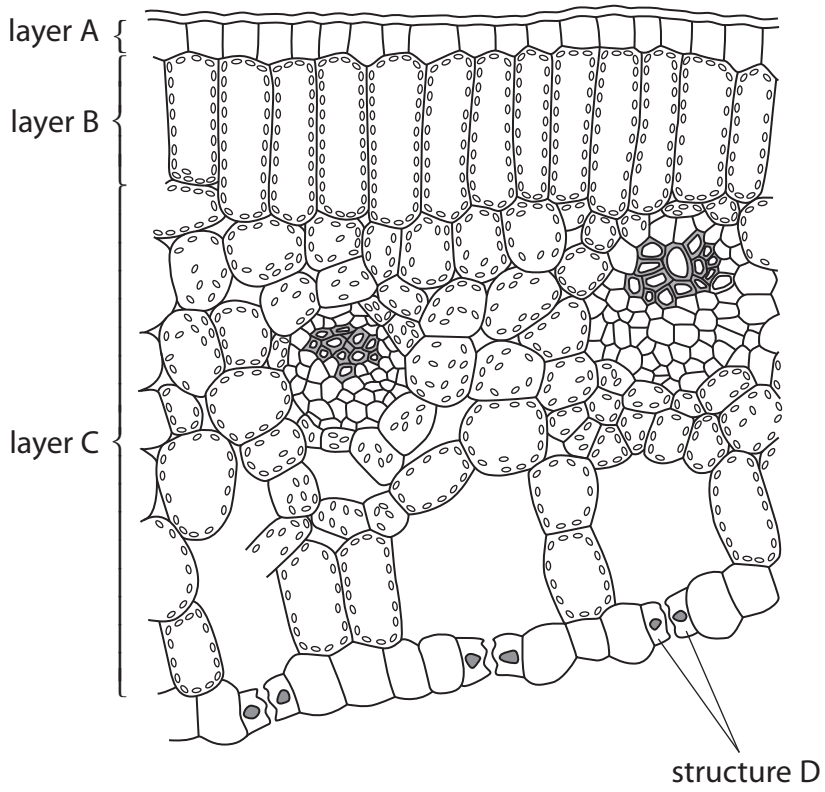
(1)

(d) Explain why reducing the blood supply to the heart muscle cells can cause a heart attack.

(3)

(Total for Question 8 = 12 marks)

9 The diagram shows a cross section through a leaf.



(a) Each part of the leaf is adapted for a specific function.

Name each part of the leaf and explain how it helps the leaf in photosynthesis.

(i) Layer A

(2)

.....

.....

.....

.....

(ii) Layer B

(3)

.....

.....

.....

.....

.....

.....

(iii) Layer C

(3)

(iv) Structure D

(2)

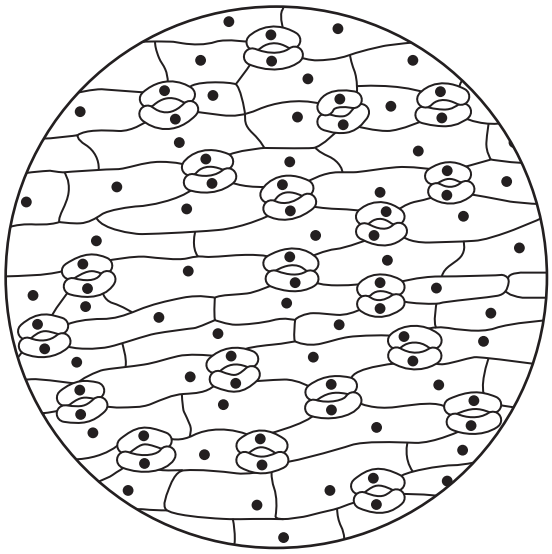
(b) Water lilies float on the surface of ponds. Structure D is found on the upper surface of a water lily rather than the lower surface.

Suggest a reason for this adaptation.

(2)

(c) A student examined the upper and lower surfaces of a leaf from a land plant using a microscope.

This is her diagram of the lower surface.



(i) How many stomata are shown in the diagram?

(1)

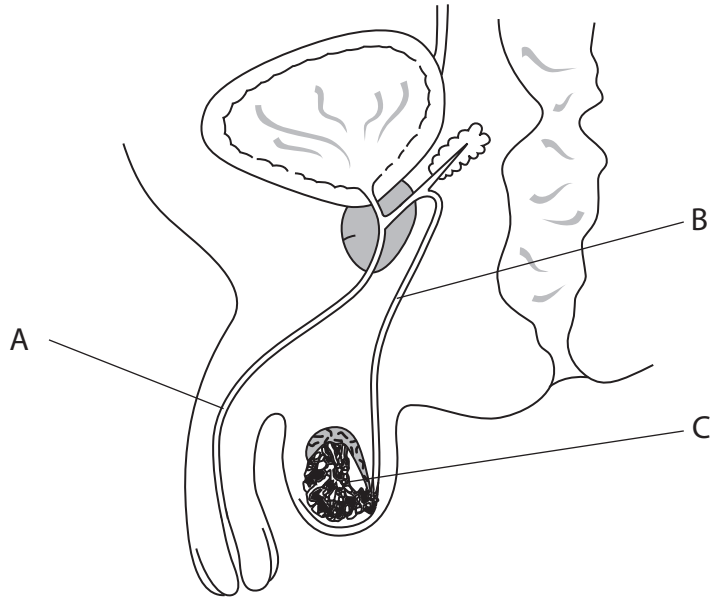
(ii) Suggest how the upper surface of the land plant would differ from this diagram.

(1)

(Total for Question 9 = 14 marks)

BLANK PAGE

10 The diagram shows the male reproductive organs.



(a) Name the structures labelled A, B and C.

(3)

A .....

B .....

C .....

(b) A couple want to control their fertility.

The man has an operation to cut tube B.

Explain how this operation would prevent his partner from becoming pregnant.

(2)

.....

.....

.....

.....

(c) The woman could also have an operation to cut her oviducts to prevent pregnancy.

Suggest why the operation to cut tube B in males is much more common than the operation to cut the oviducts in females.

(2)

(d) Structure C produces a hormone.

Name this hormone and describe its functions.

(3)

(Total for Question 10 = 10 marks)

11 Farmers in Asia add fertiliser to their crops to increase the yield.

Fertilisers usually contain nitrate, phosphate and potassium.

The table shows the farmers' crop yield when the crops are given a fertiliser lacking one of these three minerals.

A figure of 100% is the maximum yield with all three minerals given.

	Yield (%)			
Crop	**No nitrate**	**No phosphate**	**No potassium**	**All three minerals added**
lowland rice	73	97	99	100
barley	52	66	72	100
rye	44	70	68	100
wheat	46	69	72	100
upland rice	46	66	90	100
potato	47	47	70	100

(a) (i) State the mineral that has the greatest effect on crop yield.

(1)

.....

(ii) Explain why this mineral has the greatest effect on crop yield.

(2)

.....

.....

.....

.....

(b) Which crop is most affected by the lack of potassium?

(1)

.....

(c) Suggest why the minerals had different effects on lowland rice and upland rice.

(1)

(d) The yield is the mass of the useable part of the crop and is measured in kg per m^2.
The yield is often measured in dry mass rather than fresh mass.

(i) Suggest why dry mass is used.

(1)

(ii) Suggest how the dry mass of 10 kg of fresh potato tubers could be determined.

(2)

(e) The table gives data as a percentage of the yield with all minerals present.

Explain why a percentage is used rather than changes in kg per m^2.

(2)

(f) A farmer grew another crop with all three minerals added. The maximum yield obtained was 12 kg per m^2. He grew the same crop with no nitrate and the yield was 5 kg per m^2.

Calculate the percentage of the maximum yield when the crop was grown with no nitrate.

Show your working.

(2)

Answer ..... %

(Total for Question 11 = 12 marks)

12 Eating garlic is thought to reduce the chance of being bitten by insects, such as mosquitoes.

Design an investigation to find out if people who have eaten garlic are less likely to attract mosquitoes than people who have not eaten garlic.

Your answer should include experimental details and be written in full sentences.

(6)

(Total for Question 12 = 6 marks)

TOTAL FOR PAPER = 120 MARKS

BLANK PAGE

Every effort has been made to contact copyright holders to obtain their permission for the use of copyright material. Pearson Education Ltd. will, if notified, be happy to rectify any errors or omissions and include any such rectifications in future editions.