Write your name here

Surname	Other names

Edexcel Certificate
Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Unit: KBI0/4BI0
Paper: 2B

Thursday 13 June 2013 – Morning **Time: 1 hour**	Paper Reference **KBI0/2B** **4BI0/2B**

You must have:
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 60.
- 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 ▶

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P 4 1 5 5 3 A 0 1 1 6

PEARSON

Answer ALL questions.

1 Read the passage below. Use the information in the passage and your own knowledge to answer the questions that follow.

Micropropagation: good or bad?

Plant cells have the ability to produce a genetically identical copy of their parent plant. They can do this because the information is coded in the sequence of bases in their DNA. Micropropagation involves taking small pieces, known as explants, from a plant with the desired characteristics. The explants are sterilised and then put into a growth medium containing sucrose, amino acids and a variety of minerals as well as growth promoting chemicals.

All the young plants produced from the original cell or piece of tissue are clones. The sterile conditions in which they have been grown allow these plants to be disease free. Micropropagation can also produce plants which are free of pathogens such as viruses.

Micropropagation is used to produce commercial quantities of plants. Large quantities of flowers are cloned in this way. The quality and characteristics of the flowers produced can be controlled more easily than when using sexual methods of reproduction. With rare or endangered plant species, micropropagation may be the last chance of reproducing them if more conventional methods have failed.

The process has been used to create large numbers of palm oil plants. The oil extracted from these plants can be used in a wide variety of food and consumer products. It can also be used to make biofuel for use as a sustainable energy source in cars.

The increased demand for the use of palm oil has had serious environmental consequences, with huge areas of rainforest being destroyed to make way for fresh plantations. Today, Malaysia and Indonesia account for 90 per cent of global production. Indonesia already has six million hectares of oil palm plantations, with plans for another four million by 2015 dedicated to biofuel production. This destruction of habitat will result in more rainforests disappearing, pushing several species such as the orangutan towards extinction.

(a) Name one base found in DNA (line 3).

(1)

.....

(b) Suggest why explants are sterilised (line 4).

(2)

.....

.....

.....

.....

(c) Suggest why amino acids are provided in the growth medium (line 5).

(1)

.....

(d) What is meant by the term **pathogen** (line 10)?

(1)

.....

(e) Suggest two reasons why growers prefer to use micropropagation rather than sexual methods of reproduction to produce good quality flowers (lines 11 to 14).

(2)

1 .....

.....

2 .....

.....

(f) Suggest what is meant by the term **sustainable energy source** (lines 19 and 20).

(1)

.....

.....

(g) The destruction of habitat can lead to extinction of species.

Give three other disadvantages of deforestation.

(3)

1 .....

.....

2 .....

.....

3 .....

.....

(Total for Question 1 = 11 marks)

2 (a) The table describes stages in the water cycle.

Complete the table by naming or describing each stage.

The first one has been done for you.

(3)

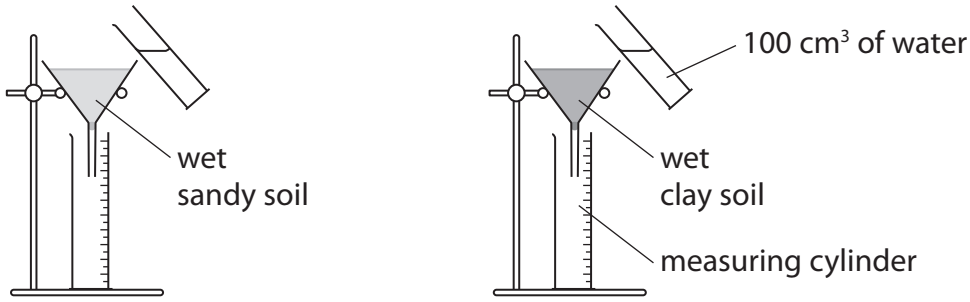
Description of stage	Name of stage
Heat from the sun causes liquid water to change into water vapour.	evaporation
Water vapour in the air changes back into liquid water.	
The liquid water falls to the earth.	
	transpiration

(b) Describe the biological consequences of pollution of water by sewage.

(4)

(Total for Question 2 = 7 marks)

3 The diagram shows the apparatus used to investigate how quickly water passes through two different types of soil.



Each funnel contained 200 g of dry soil. Water was poured into each funnel to make the soil completely wet.

Then 100 cm^3 of water was poured on to the wet soil in each funnel and allowed to drain into the measuring cylinders. The volume of water collected in the cylinders was measured every two minutes until all 100 cm^3 had been collected. The table shows the results.

Time in minutes	Volume of water collected in cm^3	
	sandy soil	clay soil
2	70	20
4	100	36
6	100	52
8	100	68
10	100	84
12	100	97
14	100	100

(a) (i) Soil type is an independent variable in this investigation.

What is meant by the term **independent variable**?

(1)

.....

.....

(ii) What is the **dependent variable** in this investigation?

(1)

.....

.....

(iii) Tick the box to show the correct controlled variable in this investigation.

(1)

Variable	Tick
mass of dry soil	
size of measuring cylinder	
volume of water collected	

(iv) Calculate the average rate in cm^3 per minute at which water drained through the clay soil. Show your working.

(2)

Answer ..... cm^3 per minute

(v) The photographs show two stop clocks, A and B, that could be used to measure the time taken for water to drain through the soil in this investigation.

stop clock A



stop clock B



Which of these two stop clocks would give a more precise reading?
Explain your answer.

(1)

.....

.....

.....

(b) Sandy soil contains large soil particles with big air spaces between them.

Clay soil contains very small soil particles with small air spaces between them and most of these air spaces are filled with water.

(i) Suggest why many plants may find it difficult to grow in sandy soil.

(2)

.....

.....

.....

.....

(ii) Use your knowledge of how plant roots absorb mineral ions to suggest why some plants may find it difficult to grow in clay soil.

(2)

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.....

.....

(Total for Question 3 = 10 marks)

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4 (a) Lactose is a sugar found in milk. It is digested by an enzyme called lactase. Some people cannot make lactase. The condition they have is called lactose intolerance.

The condition is caused by a recessive allele. This means that only people with the homozygous recessive genotype can be lactose intolerant.

(i) What is meant by the term **homozygous**?

(1)

.....

(ii) State the two possible genotypes of an individual who is **not** lactose intolerant.

Use the symbols **D** for the dominant allele and **d** for the recessive allele.

(2)

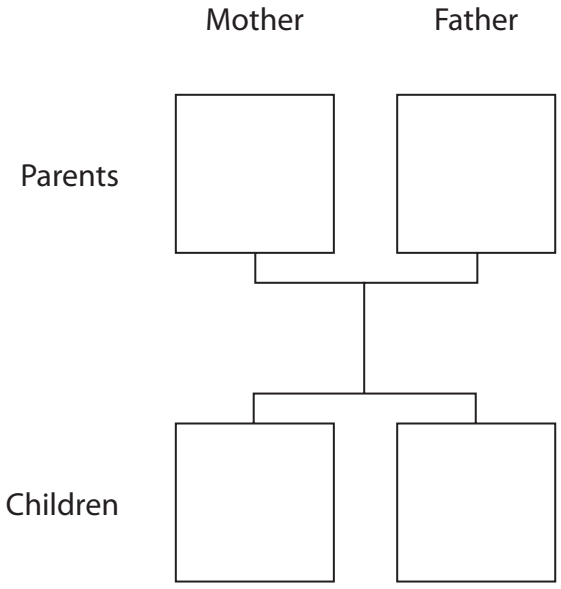
1 .....

2 .....

(b) (i) A homozygous dominant mother and a homozygous recessive father have two children.

In the boxes below give the genotypes of the parents and their children.

(2)



(ii) What is the probability that the children are lactose intolerant?

(1)

.....

(c) People from different countries were tested to find out if they were lactose intolerant. The table shows the number of people who were tested in each country and the percentage who were lactose intolerant.

Country	Number of people tested	Percentage who were lactose intolerant
A	160	4
B	315	12
C	134	18
D	20	75
E	59	89
F	71	93
G	134	98
H	24	100

(i) The population size of country B is 190 million.

Calculate the number of people in this country likely to be lactose intolerant.

Show your working.

(2)

Answer .....

(ii) Suggest a reason why the value of 100% for country H may not be correct.

(1)

.....

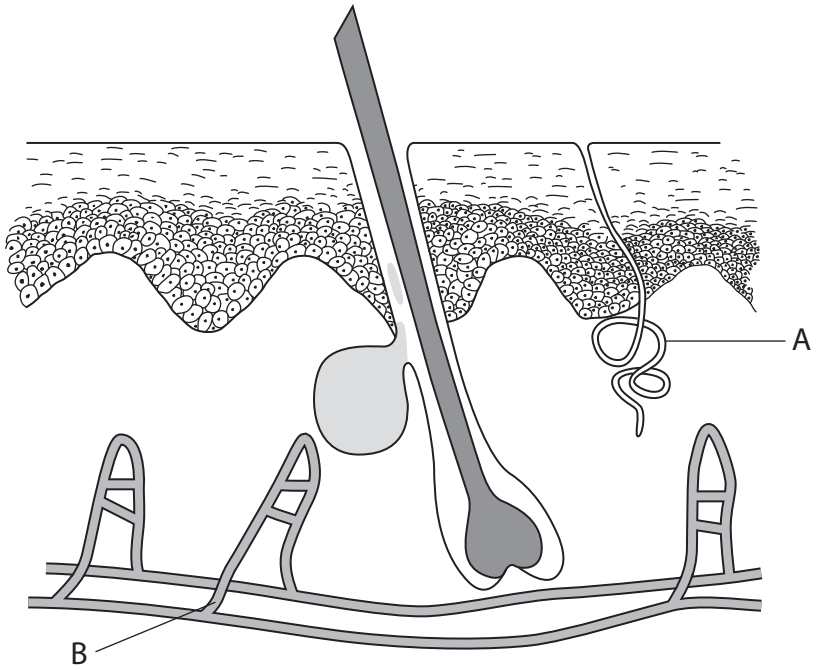
(Total for Question 4 = 9 marks)

5 The skin is an organ of homeostasis and excretion.

(a) Describe what is meant by the term **excretion**.

(2)

(b) The diagram shows a section through the skin with two structures labelled A and B.



The structures labelled A and B play a part in homeostasis when a person enters a very warm environment.

(i) Explain the role of structure A.

(3)

(ii) Explain the role of structure B.

(3)

(c) Some hormones are involved in homeostasis.

(i) Explain the role of insulin in homeostasis.

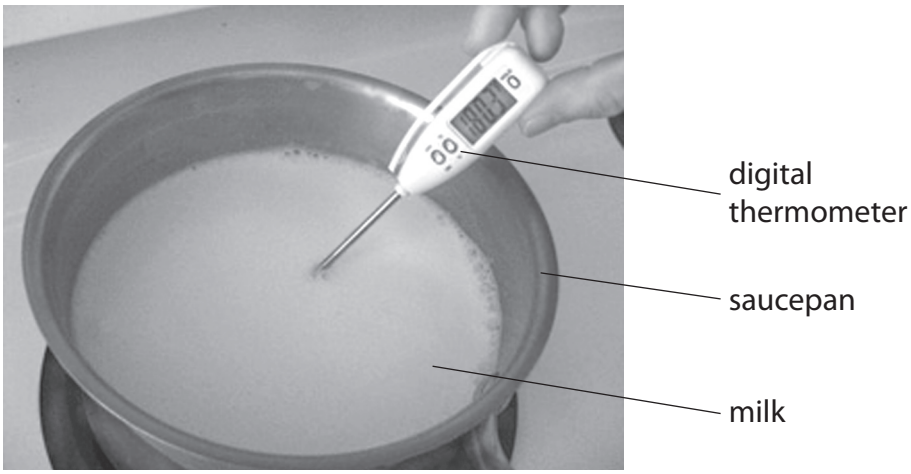
(2)

(ii) Explain the role of ADH in homeostasis.

(3)

(Total for Question 5 = 13 marks)

6 A student found the following instructions for making yoghurt on the internet.



- put milk in a saucepan and heat the milk to 80 °C
- pour the hot milk into a bowl and leave to cool to 46 °C
- add the organisms needed to change the milk into yoghurt
- pour the yoghurt into glass jars and put them into a warm place for 8 hours
- pour the yoghurt into a sterile, airtight container and put it in the fridge

(a) Name an organism added to change the milk into yoghurt.

(1)

.....

(b) Explain why the milk is heated to 80 °C.

(2)

.....

.....

.....

.....

(c) Explain why the milk must be cooled to 46 °C.

(2)

(d) Explain why the yoghurt is kept in a warm place for 8 hours.

(2)

(e) Changes take place to the pH of the yoghurt when it is kept warm for 8 hours.

Describe and explain how the change in pH helps to preserve the yoghurt.

(3)

(Total for Question 6 = 10 marks)

TOTAL FOR PAPER = 60 MARKS

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