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Surname	Other names
Centre Number	Candidate Number
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Edexcel IGCSE	
Human Biology	
Unit: 4HB0	
Paper: 02	
Wednesday 11 May 2011 – Morning Time: 1 hour	Paper Reference 4HB0/02
You must have: Candidates may use a 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.

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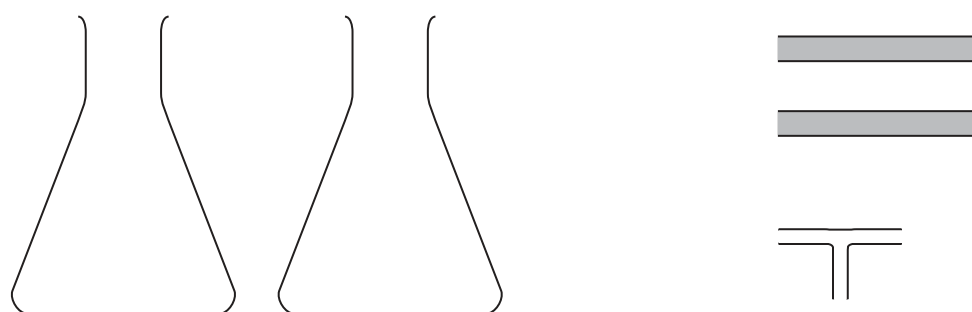


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Answer ALL questions.

- 1 (a) A student is provided with the apparatus shown in the diagram below.



- (i) The student used this apparatus in an experiment to compare the carbon dioxide content of air breathed in and air breathed out.

Draw a labelled diagram to show how the apparatus should be set up.

(4)



(ii) Name a liquid that would need to be used in this experiment.

(1)

(iii) Explain the function of this liquid.

(2)

(iv) Complete your diagram to show the liquid in the apparatus.

(2)

(v) Suggest a safety precaution that should be taken when using the apparatus.

(1)

(Total for Question 1 = 10 marks)



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

Iodine is used to make the hormone secreted by the thyroid gland.

A diet deficient in iodine leads to problems with the secretion of this hormone. These problems are shown by a swelling of the thyroid gland, called a goitre.

In areas where the supply of iodine in the water is very low, large numbers of people have goitres. In these areas goitres are said to be endemic.

There is an inverse relationship between the intake of iodine and the numbers of the population with endemic goitre. Trials of the effects of giving small amounts of iodine to a population with endemic goitre took place in the USA in 1916. The results of the trials showed that only 0.2% of children without goitre who took iodine over the four years of the trial developed a goitre whereas 28% of those not taking iodine did develop a goitre.

Today iodine is given to large populations by adding it to table salt. As a result of this measure the incidence of goitre has fallen by about 90%.

(a) (i) Explain what is meant by the term **endemic**.

(2)

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(ii) Describe the position of the thyroid gland in the body.

(2)

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(iii) Name the hormone secreted by the thyroid gland.

(1)

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(b) Explain what is meant by the term **inverse relationship** in the passage.

(2)

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(c) What evidence is given in the passage to suggest that a lack of iodine is not the only cause of goitre?

(2)

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(Total for Question 2 = 9 marks)



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3 Haemophilia is a sex-linked recessive condition of humans. People with haemophilia take longer to form blood clots. Females who are heterozygous for this condition are described as being carriers.

(a) Explain what is meant by the following terms.

(i) sex-linked

(2)

.....

.....

.....

(ii) carrier

(2)

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(b) State **two** reasons why it is important that blood clots quickly.

(2)

1

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2

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(c) A male, normal for blood clotting, marries a female who is a carrier for haemophilia.

Give the genotypes and gametes of the married couple and the genotypes and phenotypes of any children they may produce.

Use the symbol X^H for the allele for normal blood clotting and the symbol X^h for the allele for haemophilia.

(4)

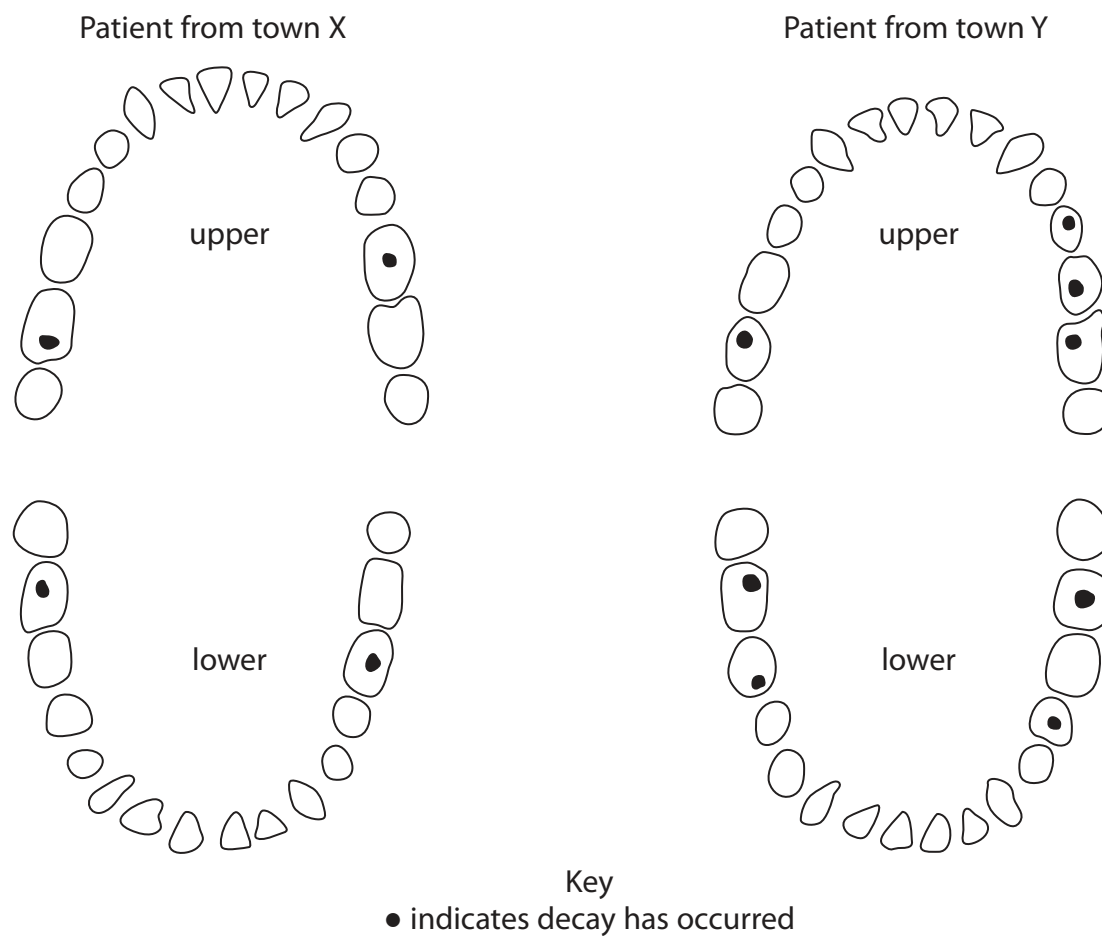
	genotype of female carrier	×	genotype of normal male	
	
gametes
genotypes of children
phenotypes

(Total for Question 3 = 10 marks)



7
Turn over ▶

- 4 (a) The diagrams show plans of teeth in the upper and lower jaws of two male patients from two different towns, X and Y.



- (i) Four teeth have decayed in the patient from town X. How many teeth have decayed in the patient from town Y?

(1)

- (ii) Calculate the percentage of decayed teeth in the patient from town X. Show your working.

(2)

.....%



(iii) The percentage of teeth that have decayed in the patient in town Y is higher than that in the patient in town X. Suggest **three** reasons to explain this difference.

(3)

1

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2

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3

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(b) Describe how tooth decay is caused.

(4)

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(c) Explain why it is mainly teeth at the back of the mouth that have decayed.

(2)

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(d) Explain, with reasons, why the jaws shown are of adults rather than boys.

(2)

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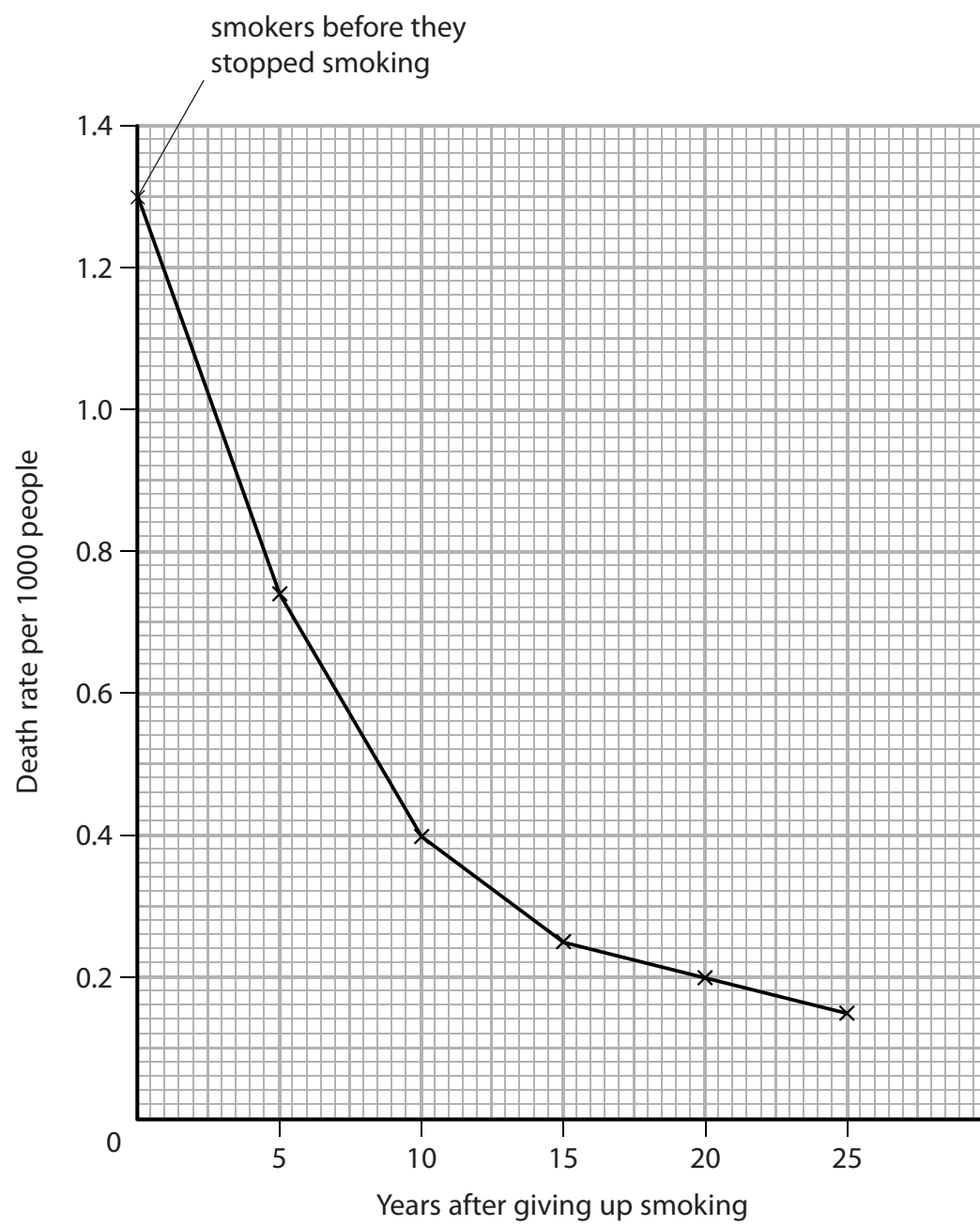
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(Total for Question 4 = 14 marks)



- 6 The graph shows the death rate per 1000 people for smokers who have stopped smoking for up to 25 years.



- (a) (i) State the death rate of smokers before they gave up smoking.

(1)

- (ii) The average death rate for non-smokers over the 25-year period is 0.12 per 1000 people. Show this information on the graph.

(1)



(b) State **two** conclusions that can be made from the graph about smoking and its effects on death rate.

(2)

1

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2

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(c) Describe in detail **two** effects of smoking, other than lung cancer, on the respiratory system.

(4)

1

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2

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(d) Explain **one** reason why smokers have an increased risk of a heart attack.

(2)

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(Total for Question 6 = 10 marks)

TOTAL FOR PAPER = 60 MARKS



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