

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

0235/02

**SCIENCE
HIGHER TIER
BIOLOGY 1**

A.M. TUESDAY, 24 January 2012

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	4	
3	5	
4	6	
5	4	
6	3	
7	5	
8	5	
9	7	
10	5	
TOTAL	50	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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 in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

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Answer **all** questions.

1. John and Tracey are a young couple who each smoke 25 cigarettes a day on average. They have both tried to stop smoking many times without success.

(a) Why do John and Tracey find it so difficult to stop smoking? [1]

(b) Suggest **two** reasons why John and Tracey should wish to stop smoking. [2]

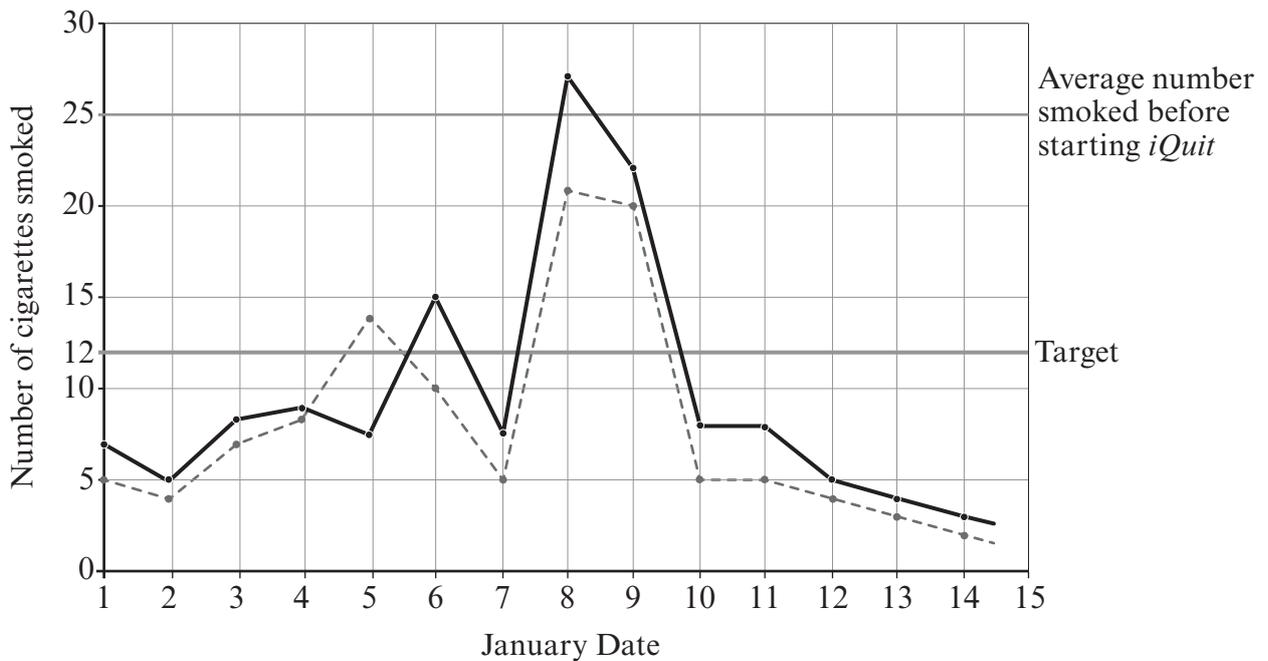
(i)

(ii)

(c) Both John and Tracey downloaded an ‘iQuit Smoking’ App to their mobile phones. Using this App they input the maximum number of cigarettes they wish to smoke in a day - the target - and also the **actual** number of cigarettes they smoke each day. The App then produces a graph of the progress made in attempting to stop smoking.

The graph below shows the data from John and Tracey’s first 2 weeks of this attempt at stopping smoking.

iQuit Smoking progress chart



Key:
 ---- John
 ——— Tracey

(i) For how many days did John smoke more than his target number of cigarettes? [1]

..... days.

(ii) Use the graph to explain why John and Tracey’s attempt at stopping smoking has been a success so far. [2]

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2. The European adder (*Vipera berus*) is a snake found in many parts of Wales. The body colour is usually brown, cream or red with a dark zig-zag pattern along the back.

European adder



- (a) What word is used to describe the differences between members of the same species? [1]

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- (b) Adders whose colour is all black are seen occasionally.

- (i) What word is used to describe this sudden change in colour? [1]

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- (ii) What chemical is altered to cause this change in colour? [1]

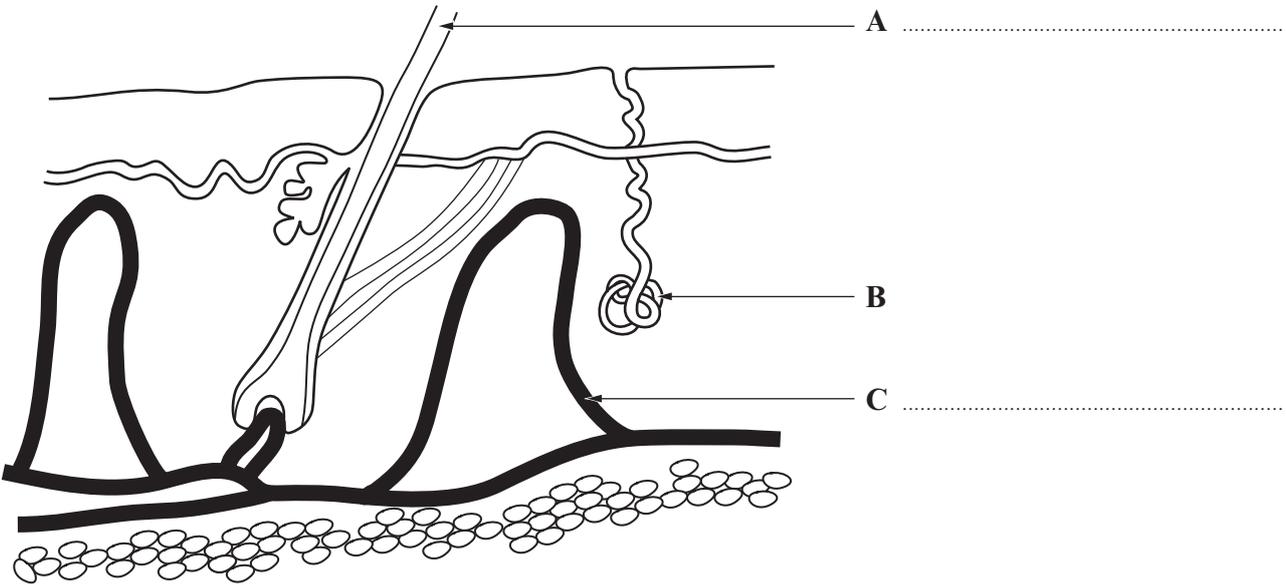
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- (c) State **one** way the offspring produced by sexual reproduction differ from those produced by asexual reproduction. [1]

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3. The diagram shows a section through human skin.



- (a) Label parts **A** and **C** on the diagram. [2]
- (b) When the body temperature rises, explain how part **B** helps to lower it. [3]

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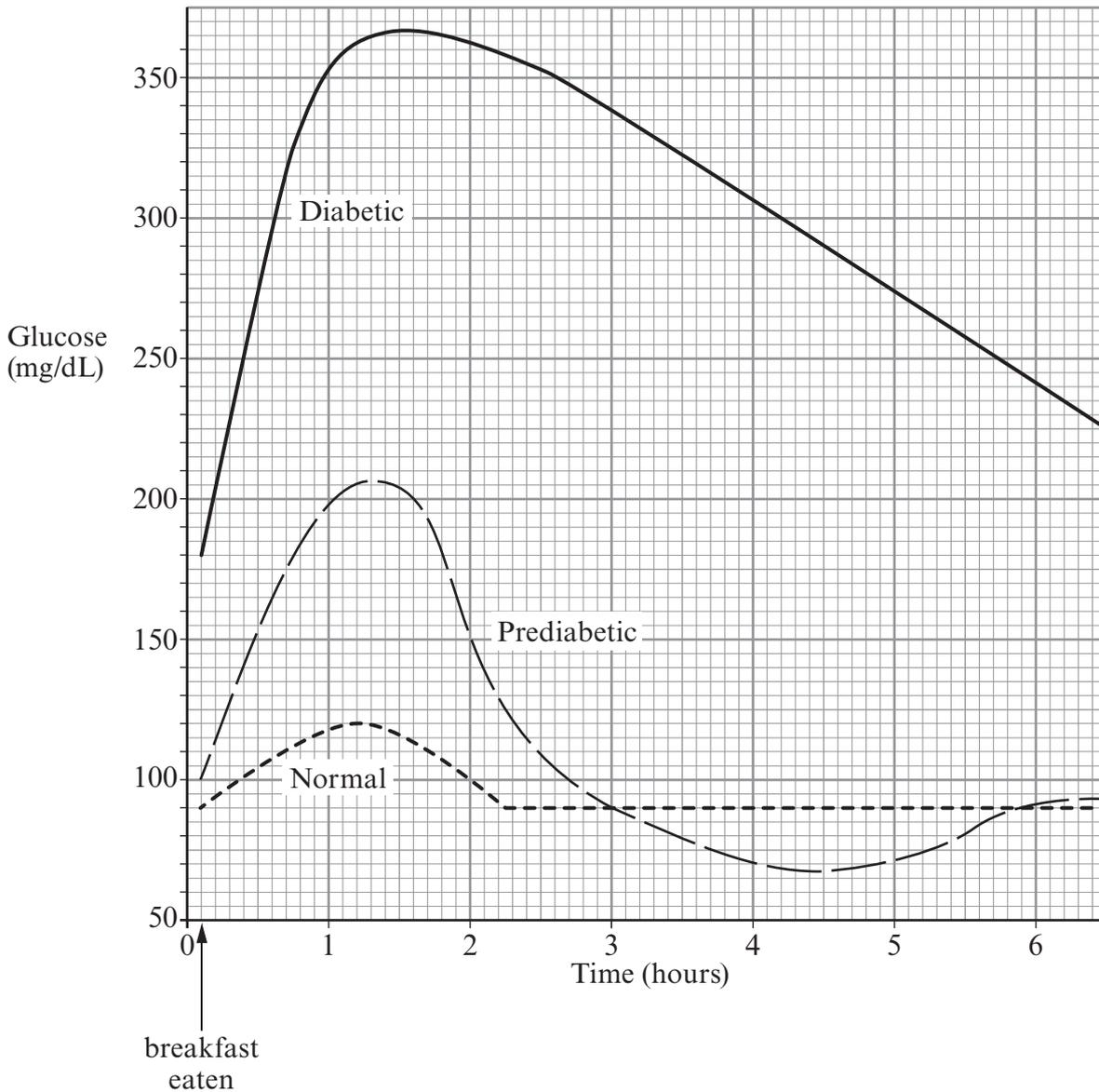
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4. The blood glucose level of people with no sign of diabetes is 80 - 90 mg/dL before meals and may rise up to 120 mg/dL after they eat. (mg/dL = milligrams of glucose per decilitre of blood).

The blood glucose levels in 3 men were measured first thing in the morning and every hour for the next 6 hours. Each of the men ate exactly the same food for breakfast.

The results are shown in the graph below.



(a) A prediabetic is a person who is developing diabetes. Describe how the results of the prediabetic man differ from the results of the normal man. [3]

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(b) How could the **diabetic** man avoid the high rise in blood glucose that occurs after eating? [1]

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(c) No more food was eaten during the six hours after breakfast. What is happening in the body of the normal man to reduce the blood glucose level between hours one and two? [2]

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5. In rabbits the allele for black fur (**B**) is dominant to the allele for white fur (**b**). A rabbit breeder bought a rabbit with black fur but she didn't know whether it was homozygous black or heterozygous black. The breeder used a white rabbit to find out the genotype of the black rabbit.

- (a) Complete the two Punnett squares below to show how the breeder could find out the genotype of the black rabbit. [2]

Cross 1 – if the black rabbit is **BB**.

Gametes		

Cross 2 – if the black rabbit is **Bb**.

Gametes		

- (b) Explain how the results shown in the Punnett squares determine whether the bought rabbit was homozygous or heterozygous. [2]

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6.

Ghost slug (*Selenochlamys ysbryda*)



Google images

In 2008, a type of slug was discovered in a garden in Caerphilly, South Wales. It had probably been introduced by accident in plant pots from abroad. This slug was new to ‘science’, and it was given the common name of *ghost slug*. Biologists compared a chemical from it with the same chemical from other types of slugs to see if they were closely related.

(a) Name the chemical that was compared. [1]

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(b) From which structures found in the nucleus of cells was the chemical taken? [1]

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(c) Give **one** reason why scientists use scientific rather than common names for organisms. [1]

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7. Using some of the letters from the list below, complete the table to show the children produced by the possible combinations of X and Y chromosomes.
Place **one** letter in each box.

List: Possible children produced

A = twins, one boy and one girl;

B = identical twin girls;

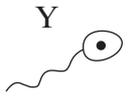
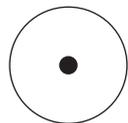
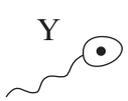
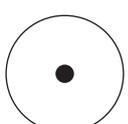
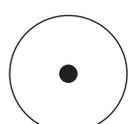
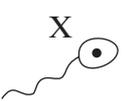
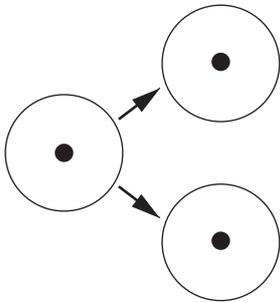
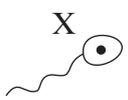
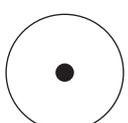
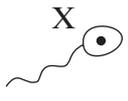
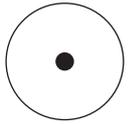
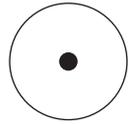
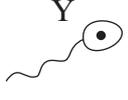
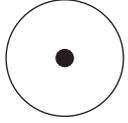
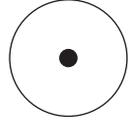
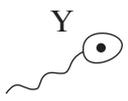
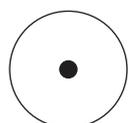
C = twin boys, one with brown eyes the other with blue eyes;

D = one boy;

E = one girl;

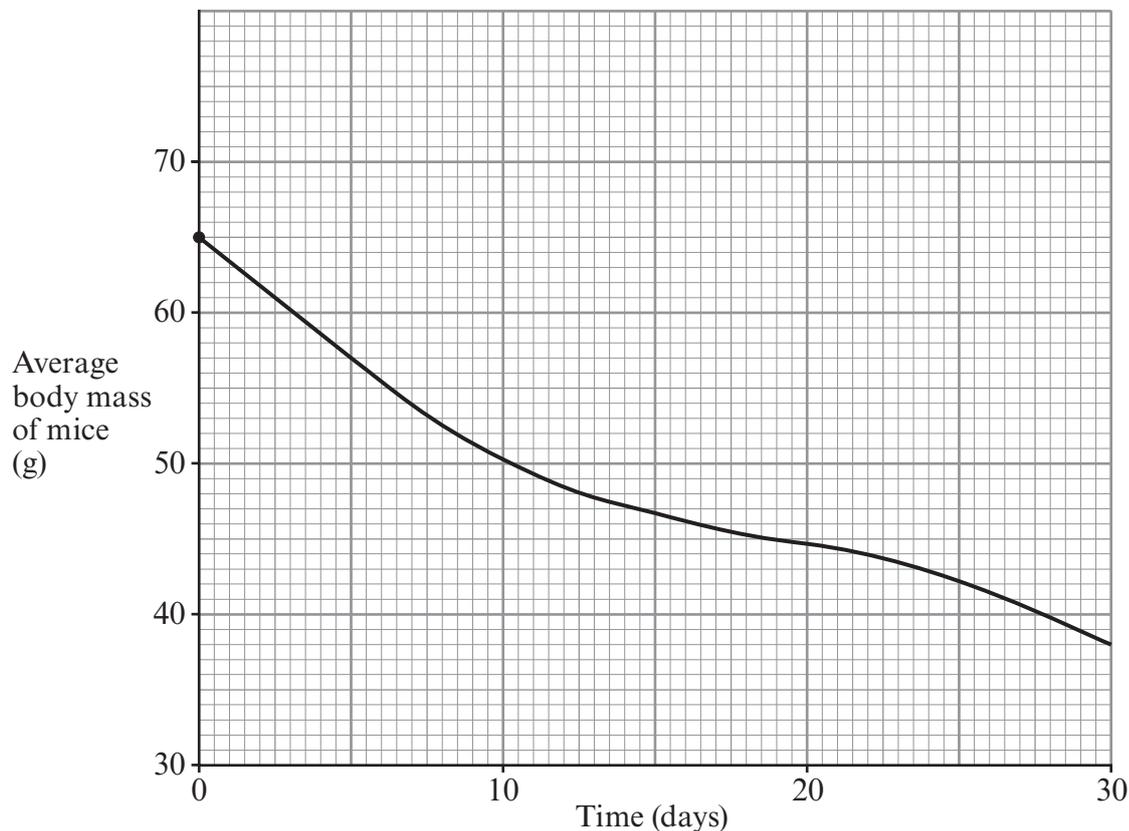
F = twin girls, one with red hair and one with brown hair.

[5]

Sperm and its sex chromosome	Egg	Fertilized egg	Children produced
		
		
		
		
		
		
		

8. Scientists have used mice when investigating the possibility of reducing obesity in humans. Obesity increases the risk of developing heart disease. Mice produce a hormone called leptin. Leptin controls body mass by affecting the part of the brain involved with appetite.

In 1998 an experiment was set up to measure how leptin affects body mass. A group of adult mice were injected with leptin every day for 30 days. The same mass of food was available each day throughout the experiment. The graph below shows how their body mass changed.



- (a) Suggest an explanation of how leptin is involved in the decrease in mass shown in the graph. [2]

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- (b) (i) Another group of adult mice, with an average mass of 70 g, were given the same mass of food as the test group but were not injected with leptin. Draw a line on the graph to show the results you would expect for this group of mice. [1]

- (ii) What word describes the group of mice that were used to make this comparison? [1]

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- (c) Give **one** reason why some people might object to this research involving mice. [1]

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9. Modern humans belong to the species *Homo sapiens* and have evolved from more primitive ancestors. Three of these ancestors were *Australopithecus africanus*, *Homo habilis*, and *Homo erectus*. These three species are now extinct. The table shows the average brain volume measured from the skeletal remains of each of the extinct species and of modern humans (*Homo sapiens*).

Species	When extinct. (Millions of years ago)	Average brain volume (cm ³)
<i>Australopithecus africanus</i>	2.6	400
<i>Homo habilis</i>	1.6	600
<i>Homo erectus</i>	1.0	850
<i>Homo sapiens</i>	Not extinct	1300

- (a) State **two** factors that should have been considered to make the comparison, of the brain size of these four species, fair. [2]

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- (b) Write an explanation, in terms of natural selection, for the change in brain size during the evolution of *Homo sapiens*. [4]

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- (c) Why were the ideas of Charles Darwin concerning human evolution not accepted by many people in the 19th century? [1]

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10. Describe the path taken by a nerve impulse during a withdrawal reflex when a hand touches a hot object. [5]

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**THERE ARE NO MORE QUESTIONS
IN THE EXAMINATION.**

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