

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	



General Certificate of Secondary Education
Higher Tier
January 2011

Science B
Unit Biology B1

BLY1H

H

Biology
Unit Biology B1

Written Paper

Thursday 13 January 2011 9.00 am to 9.45 am

You will need no other materials.
You may use a calculator.

Time allowed

- 45 minutes

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 45.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice

- In all calculations, show clearly how you work out your answer.



J A N 1 1 B L Y 1 H 0 1

Answer **all** questions in the spaces provided.

1 Desert plants are adapted for survival in a dry climate.

1 (a) Joshua trees live in deserts.



Joshua trees have two different types of root:

- a system of shallow roots spread out over a large area
- roots about 1 m in diameter, shaped like bulbs, deep in the soil.

Explain the advantage to the Joshua tree of having:

1 (a) (i) shallow roots spread out over a large area

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(2 marks)

1 (a) (ii) large, bulb-like roots deep in the soil.

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(1 mark)



1 (b) Creosote bushes also live in deserts.



The leaves of creosote bushes:

- are covered with a layer of wax
- fold together during the day.

Explain how the leaves of the Creosote bush help it to survive in deserts.

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(3 marks)

6

Turn over for the next question

Turn over ►



- 2** In the winter wild birds cannot find food easily.
A student carried out an investigation to find the best kind of food to put out for wild birds in winter.
- She nailed six black dishes to a piece of wood.
 - She put 100g of a different type of seed into each dish.
 - She placed the piece of wood in her garden.
 - She observed the birds that visited each of the dishes before school, after school and at weekends.
 - At the end of the investigation, she weighed the amount of each type of seed remaining.
 - She also calculated the percentage of each type of seed that was eaten by the birds.

2 (a) Name **two** control variables in this investigation.

1

2

(2 marks)

2 (b) **Table 1** shows the number of bird visits to each dish of seeds that she recorded.

Table 1

Bird species	Number of visits to each dish of seeds					
	Corn	Niger	Safflower	Sunflower	Peanut	Millet
Morning Dove	12	10	6	13	2	10
Red-bellied Woodpecker	1	0	0	1	4	0
Dark-eyed Junco	3	6	1	4	0	3
Northern Cardinal	0	0	1	1	2	0
American Goldfinch	0	31	5	18	0	0
House Finch	1	5	23	19	1	3
House Sparrow	16	1	0	4	0	11
Total visits	33	53	36	60	9	27

2 (b) Which type of seed had visits from the greatest number of **different** bird species?

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(1 mark)



- 2 (c)** **Table 2** shows:
- the percentage of each type of seed eaten
 - the percentage of fat in each type of seed.

Table 2

Type of seed	Percentage eaten	Percentage of fat
Corn	68	2
Niger	77	40
Safflower	86	3
Sunflower	91	35
Peanut	4	48
Millet	99	2

- 2 (c) (i)** The girl concluded that the most popular seeds for the birds were the seeds with the highest percentage of fat.

Was her conclusion justified by the data in **Table 2**?

Draw a ring round your answer. **Yes / No**

Give a reason for your answer.

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(1 mark)

- 2 (c) (ii)** Most winter bird food for sale in shops contains niger and sunflower seeds. Use the information in **Table 1** and **Table 2** to suggest **two** reasons why.

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(2 marks)

6

Turn over ►



3 In-vitro fertilisation (IVF) is used to help some women get pregnant.

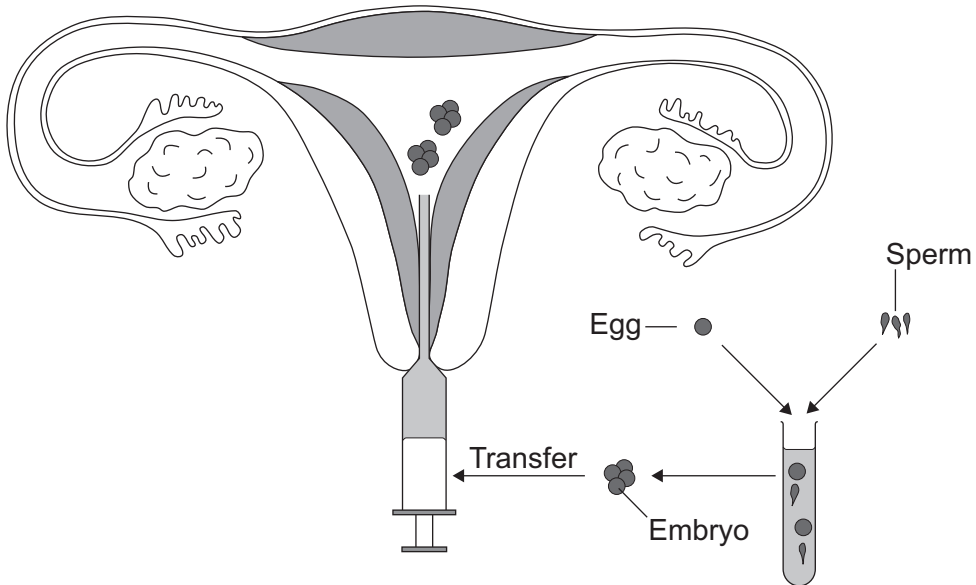
3 (a) Name the **two** hormones used in IVF treatment.

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(2 marks)

3 (b) The diagram shows the process of IVF.



Describe the process of IVF. Use information from the diagram to help you.

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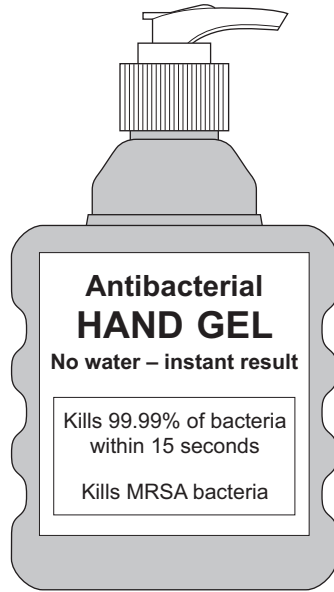
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(4 marks)



- 4 MRSA strains of bacteria are causing problems in many hospitals.
- 4 (a) The diagram shows a hand-gel dispenser.



Hand-gel dispensers are now placed at the entrance of most hospital wards.

Explain why.

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(2 marks)

- 4 (b) Explain, as fully as you can, how MRSA strains of bacteria became difficult to treat.

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(3 marks)

5

Turn over ►



5 Scientists estimate that about one third of cancers in the UK may be linked to obesity.

5 (a) Name **two** diseases linked to obesity.

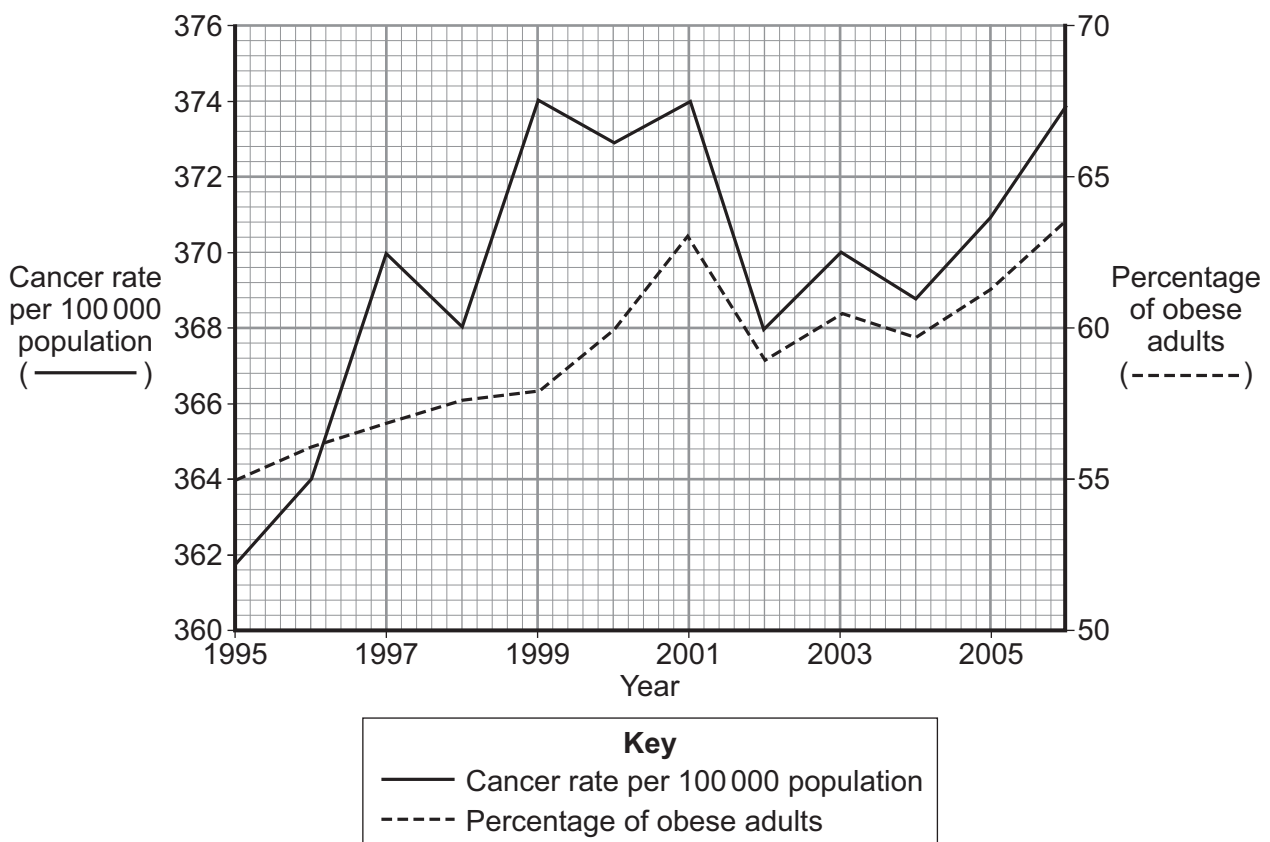
Do **not** give cancer as one of your answers.

1

2

(2 marks)

The graph shows the changes in the cancer rate and the changes in the percentage of obese adults in the UK from 1995 to 2006.



5 (b) Does the data in the graph prove that obesity causes cancer?

Draw a ring round your answer. **Yes / No**

Explain the reason for your answer.

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(2 marks)

5 (c) Exercise helps a person to lose weight.

Explain why.

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(2 marks)

6

Turn over for the next question

Turn over ►



6 Many recreational drugs harm the body.

6 (a) Some people become dependent on a recreational drug.

What happens to people's bodies when they become dependent on a drug?

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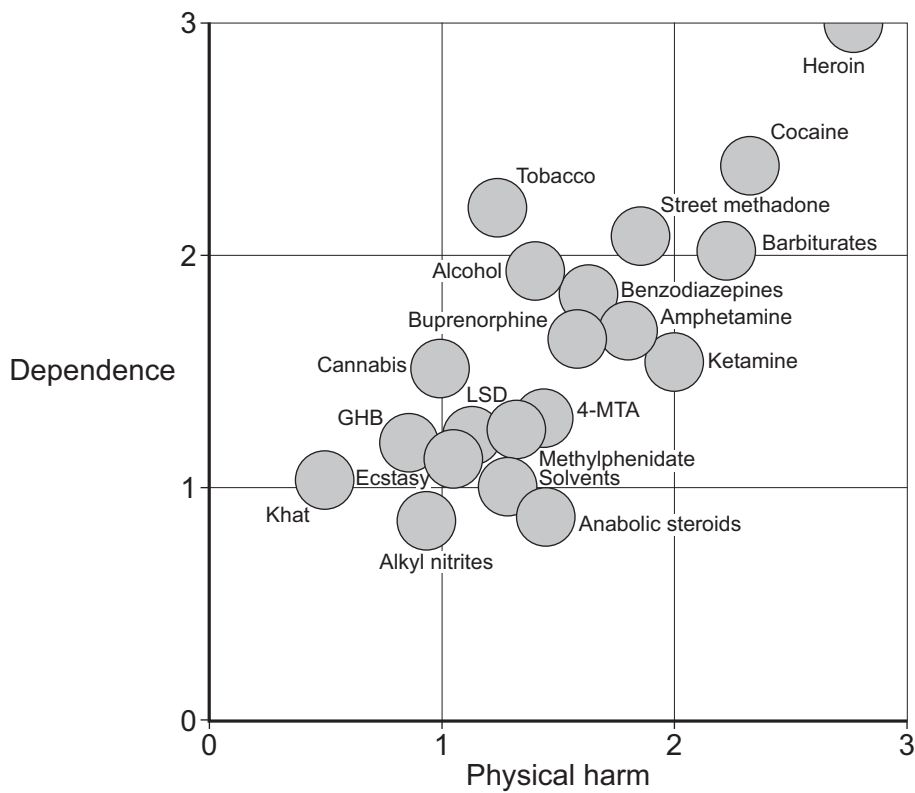
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(2 marks)

The scattergram shows the dependence and the physical harm caused by recreational drugs.



6 (b) Describe fully the relationship between physical harm and dependence on a drug.

Use data from the scattergram to help you.

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(2 marks)

6 (c) (i) Based on the data in the graph, would you expect the overall effect of alcohol on the health of the UK population to be more than the effect of heroin?

Draw a ring round your answer. **Yes / No**

Explain the reason for your answer.

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(1 mark)

6 (c) (ii) In fact the overall effect of alcohol on the health of the UK population **is** much more than the effect of heroin.

Suggest an explanation for this.

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(2 marks)

7

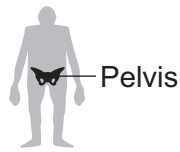
Turn over for the next question

Turn over ►

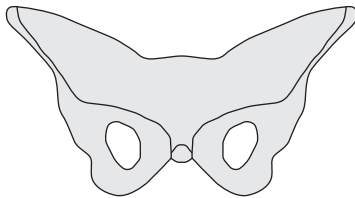


7 Humans have evolved from ape-like ancestors by natural selection.
The drawing shows the pelvis of an ape-like ancestor and a modern human.
The skull and brain of the new born baby are also shown to the same scale.
Modern humans are much more intelligent than their ape-like ancestors.

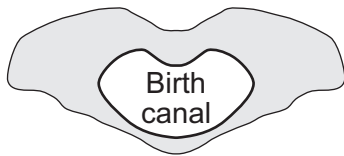
Ape-like ancestor
3.2 million years ago



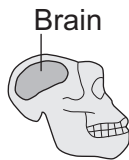
Pelvis front view



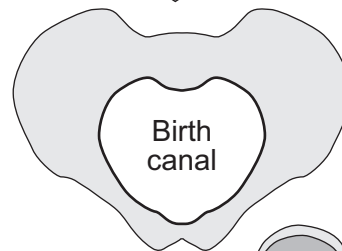
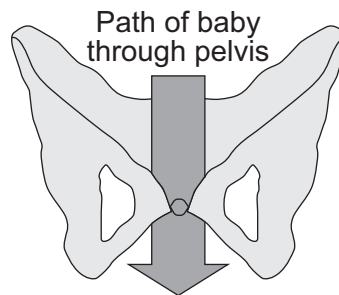
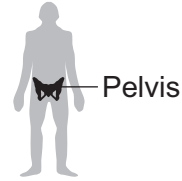
Pelvis top view



Pelvis is nearer
to that of small-
brained apes



Modern human
Today



Wide birth canal
allows woman to
have big-brained babies



Suggest an explanation for the evolution of the size and shape of the pelvis of modern humans.

Use information from the drawing to help you.

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(4 marks)

4

Turn over for the next question

Turn over ►



8 Scientists have brought an extinct species of mountain goat, the Pyrenean ibex, ‘back to life’. These scientists used skin cells from preserved Pyrenean ibex in cloning experiments.

The Scientists:

- removed the nuclei from domestic goat egg cells
- transferred cell nuclei from the skin cells of the Pyrenean ibex into domestic goat egg cells
- used the domestic goats as surrogate mothers for the embryos that developed.

The scientists made 439 cloned embryos, but only 57 were suitable for transfer into the surrogate goat mothers. Only seven of the goats got pregnant and only one live offspring was born.

Some biologists are very worried about using cloning to preserve endangered animals, because cloned animals often have developmental problems. Some endangered animals are difficult to breed in captivity. For these animals cloning is another way to continue the genetic line.

The biggest threats to endangered animals today are habitat loss, illegal hunting, pollution and climate change. Many scientists say that cloning is not as important as trying to preserve the wild places on Earth. The wild places are being lost very quickly and the animals and plants living in the wild places are dying out.

8 (a) The Pyrenean ibex was ‘brought back to life’.

How is this process different from using adult cell cloning to clone a pet animal?

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(1 mark)



There are no questions printed on this page

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- Question 6 Data reprinted from *The Lancet*, Volume 369, Authors PROF DAVID NUTT FMedSci, LESLIE A KING PhD, WILLIAM SAULSBURY MA, PROF COLIN BLAKEMORE FRS, 'Development of a rational scale to assess the harm of drugs of potential misuse', pages 1047–1053, © 2007 with permission from Elsevier
- Question 7 www.independent.co.uk, Steve Connor, 'The brainboxes born 1.2m years ago', 14 November 2008

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