THIS IS A NEW SPECIFICATION

OCR
RECOGNISING ACHIEVEMENT

H

Wednesday 9 January 2013 – Morning

GCSE TWENTY FIRST CENTURY SCIENCE BIOLOGY A

A161/02 Modules B1 B2 B3 (Higher Tier)

A135640113

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR supplied materials:
None

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: 1 hour

A161102

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 This question is about reproduction.

(a) Bacteria, plants and some animals can reproduce **asexually**.
Which of the statements about asexual reproduction are true?
Put ticks (✓) in the boxes next to the correct statements.

Only female individuals are produced.	☐
The individuals produced are clones.	☐
Mutation is always involved.	☐
The individuals are produced from a sperm and an egg.	☐
The majority of individuals produced are infertile.	☐
The individuals produced have identical genes.	☐
Two parents are always involved.	☐

[2]

(b) It is possible to produce clones of animals.
Explain how this can occur both naturally and artificially.

.....

.....

.....

..... **[2]**

(c) Stem cells are found in the human body.
Describe the different types of stem cells and explain how they might be used to treat some diseases.

The quality of written communication will be assessed in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

[Total: 10]

2 Ali and Mary do not have cystic fibrosis, but their baby does.

(a) What does this tell us about Ali and Mary's genes for this disorder?

.....

..... **[1]**

(b) Ali and Mary consider whether or not to have another child.
These are some of the questions that they could consider before making their decision.

A	How much will it cost to have another child with cystic fibrosis?
B	What is the chance of another child of ours having cystic fibrosis?
C	If we find that the foetus has cystic fibrosis should we have a termination?
D	Do we want to have a boy or a girl?
E	What will other people think?
F	Should we discuss this with the grandparents?

(i) Which question, **A**, **B**, **C**, **D**, **E** or **F**, is an **ethical** issue?

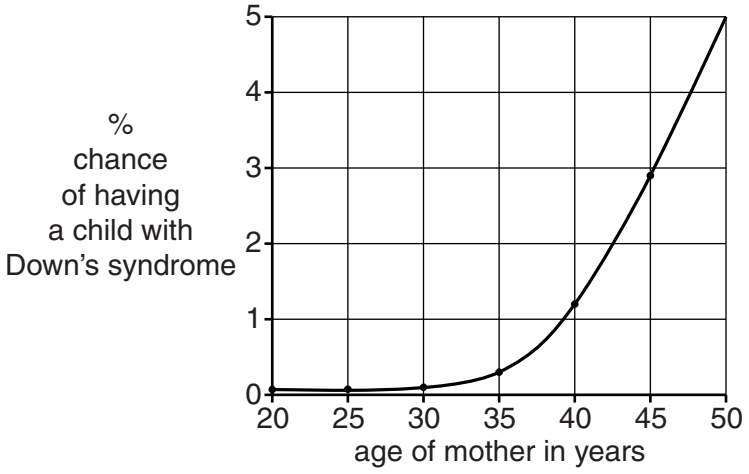
question = ... **[1]**

(ii) Which question, **A**, **B**, **C**, **D**, **E** or **F**, can be answered by **science**?

question = ... **[1]**

(c) Another couple, Rajesh and Sangeeta, are thinking of having a baby.
They talk to a genetic counsellor.
They are told that because of Sangeeta's age they have a 1% chance of having a child with Down's syndrome.
This would mean that the child could have some physical and mental issues.

Look at the graph.



(i) Describe the **trend** shown by the graph.

.....

.....

..... **[2]**

(ii) It is possible to increase confidence in the trend shown by the graph.
Put ticks (✓) in the boxes next to the **two** best methods.

ask patients how they feel	☐
use a larger sample size	☐
collect data for other genetic conditions	☐
collect data for other ages	☐
use smaller graph paper	☐
collect data from just one hospital	☐

[2]

(iii) Explain how the information supplied by the graph and the genetic counsellor could affect any decision taken by Rajesh and Sangeeta about whether or not to have a baby.

.....

.....

.....

..... **[2]**

(d) Rajesh and Sangeeta decide to have a baby.
They decide that if Sangeeta becomes pregnant, the foetus will be tested for genetic disorders.

Describe the implications that need to be considered of having the foetus tested.

The quality of written communication will be assessed in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

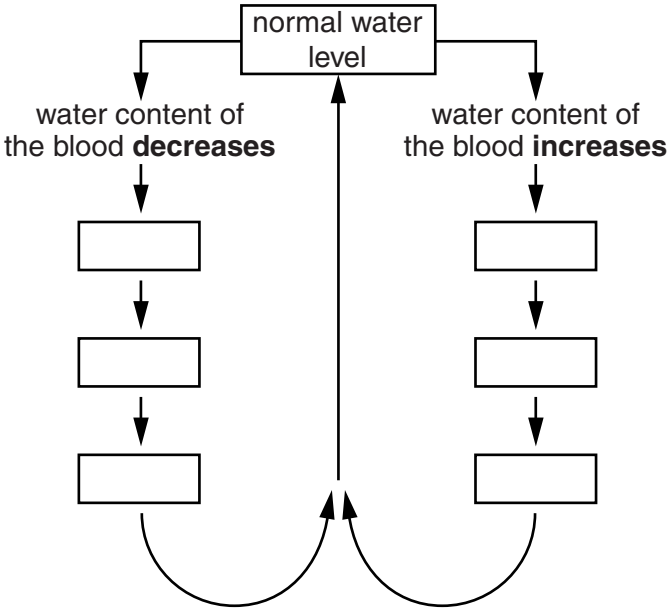
[Total: 15]

3 This question is about regulating water content in animals.

(a) Negative feedback is used to control the water content of the human body.
These statements show stages in this process.

A The kidney produces more urine.
B More ADH is released from the pituitary gland.
C The kidney reabsorbs less water from the urine.
D The kidney reabsorbs more water from the urine.
E Less ADH is released from the pituitary gland.
F The kidney produces less urine.

Write the letters, **A**, **B**, **C**, **D**, **E** and **F**, in the correct boxes.



[3]

(b) Urine production is also affected by drugs such as alcohol and Ecstasy.

Draw a straight line linking each **drug** with its **effect on ADH**.
Then draw another straight line linking the **effect on ADH** to the **effect on urine production**.

drug	effect on ADH	effect on urine production
	more ADH	larger volume of dilute urine
alcohol	no change	larger volume of concentrated urine
Ecstasy	delayed ADH production	smaller volume of dilute urine
	less ADH	smaller volume of concentrated urine
		no change in the volume or concentration of urine

[2]

(c) The gerbil is an animal adapted to living in deserts.
It feeds on plants.
The gerbil can go for very long periods of time without drinking water.
Suggest how the gerbil manages to survive on so little water.

.....

.....

.....

.....

..... **[4]**

[Total: 9]

4 Jake often goes running.

(a) He thinks running is perfectly safe.
He is going to enter a marathon for the first time.
Jake does some research into the risks of marathon running.

He reads a study that says that 1 in several thousand runners die when they run a marathon.

Use the above example to distinguish between **perceived** and **calculated** risk.

.....

.....

.....

..... **[2]**

(b) Suggest why Jake is willing to accept the risk of running a marathon.

.....

.....

..... **[2]**

(c) In the last 32 years, 11 people have died running the London marathon.
An average of 36 000 people run the marathon each year.

Calculate the chances of any individual dying whilst running the marathon.
Show your working.

chances of any individual dying during the marathon ..... **[3]**

(d) Discuss the risk to Jake in terms of probability and the consequences of running a marathon.

.....

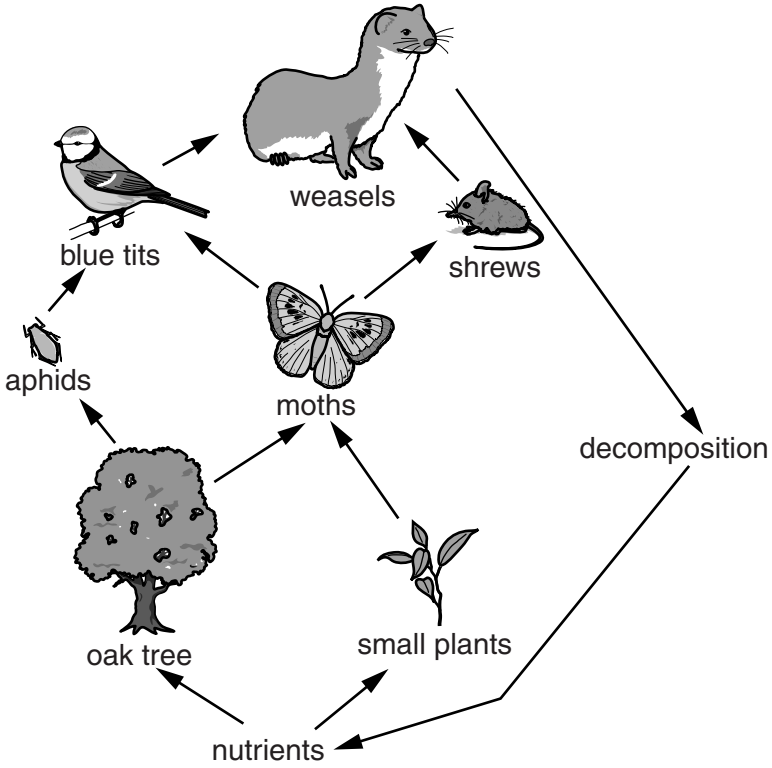
.....

.....

..... **[2]**

[Total: 9]

5 The diagram shows the flow of nutrients through a food web.



(a) Which of the following are shown by the diagram?
Put ticks (✓) in the boxes next to the correct answers.

The diagram shows …

… competition. ☐

… evolution. ☐

… natural selection. ☐

… part of an ecosystem. ☐

… transfer of nutrients. ☐

… selective breeding. ☐

… interdependence. ☐

[3]

(b) A closed loop system is one where waste materials are not lost, but are recycled within the system.
Suggest **two** reasons why the system shown by the diagram is not likely to be a closed loop system.

1 .....

.....

2 .....

.....
[2]

(c) Microorganisms are part of an ecosystem.
Microorganisms can reproduce very rapidly.

(i) If a single microorganism divides into two every 20 minutes, how many microorganisms will there be after 3 hours?
Show your working.

number of microorganisms = ... **[2]**

(ii) Some microorganisms are decomposers.
Suggest why this ability to reproduce so rapidly is important.

.....

..... **[1]**

(iii) There are many different species of microorganisms in an ecosystem.
Write down **two** processes that are involved in the production of a new species.

1 .....

2 .....
[1]

[Total: 9]

6 Environmental change can be measured using both living and non-living **indicators**.

(a) Describe and explain how named examples of these types of indicators can be used to **monitor** change in particular environments.

The quality of written communication will be assessed in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... **[6]**

(b) A climate change scientist investigates the movement of a glacier on the Greenland ice cap.

This is her data.

Flow rate in metres per day							
2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
6	5	7	6	9	8	9	11

She thinks this data shows clear evidence for a **trend**.
Other scientists disagree.

Suggest why monitoring climate change in this way requires measurements to be taken over a greater number of years than shown in this data.

.....

.....

.....

..... **[2]**

[Total: 8]

END OF QUESTION PAPER

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE