Write your name here

Surname	Other names

Centre Number | | | | | |

Candidate Number | | | | |

Edexcel GCSE

Biology/Science

Unit B1: Influences on Life

Higher Tier

Monday 5 November 2012 – Morning
Time: 1 hour

Paper Reference
5BI1H/01

You must have:
Calculator, ruler

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.*

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.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 1 7 6 0 A 0 1 1 6

PEARSON

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Evolution

1 In extreme environments organisms have characteristics that enable them to survive.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

These characteristics are

(1)

- ☒ **A** adaptations
- ☒ **B** alleles
- ☒ **C** habitats
- ☒ **D** hybrids

(ii) The photograph shows a Pompeii worm.

Pompeii worms are found in hydrothermal vents in the Pacific Ocean.

The temperature of these hydrothermal vents can be very high.

Suggest a feature that helps to protect the Pompeii worm from the extreme heat.

(1)

.....

.....

(iii) Pompeii worms were discovered by French marine biologists in the early 1980s.

Explain how these biologists may have validated the evidence for the discovery of the Pompeii worms.

(2)

(b) Variation in a population enables evolution to occur.

(i) Explain, using Darwin's theory of evolution, how variation can lead to a species evolving.

(2)

(ii) Evolution can lead to speciation.

Describe what is meant by the term **speciation**.

(2)

(Total for Question 1 = 8 marks)

Nutrient pollution

2 The photograph shows a lake which has been polluted by excess nutrients.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The build-up of nutrients in an aquatic environment is known as

(1)

- ☒ **A** decomposing
- ☒ **B** eutrophication
- ☒ **C** mutualism
- ☒ **D** parasitism

(ii) Suggest how farming can lead to a build-up of nutrients in the lake.

(2)

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(iii) State the effects of nitrates on plant growth.

(1)

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(b) (i) Nitrates can be produced by soil bacteria.

Explain how soil bacteria produce nitrates.

(3)

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(ii) Name **one** type of bacteria that reduce the nitrate content of soil.

(1)

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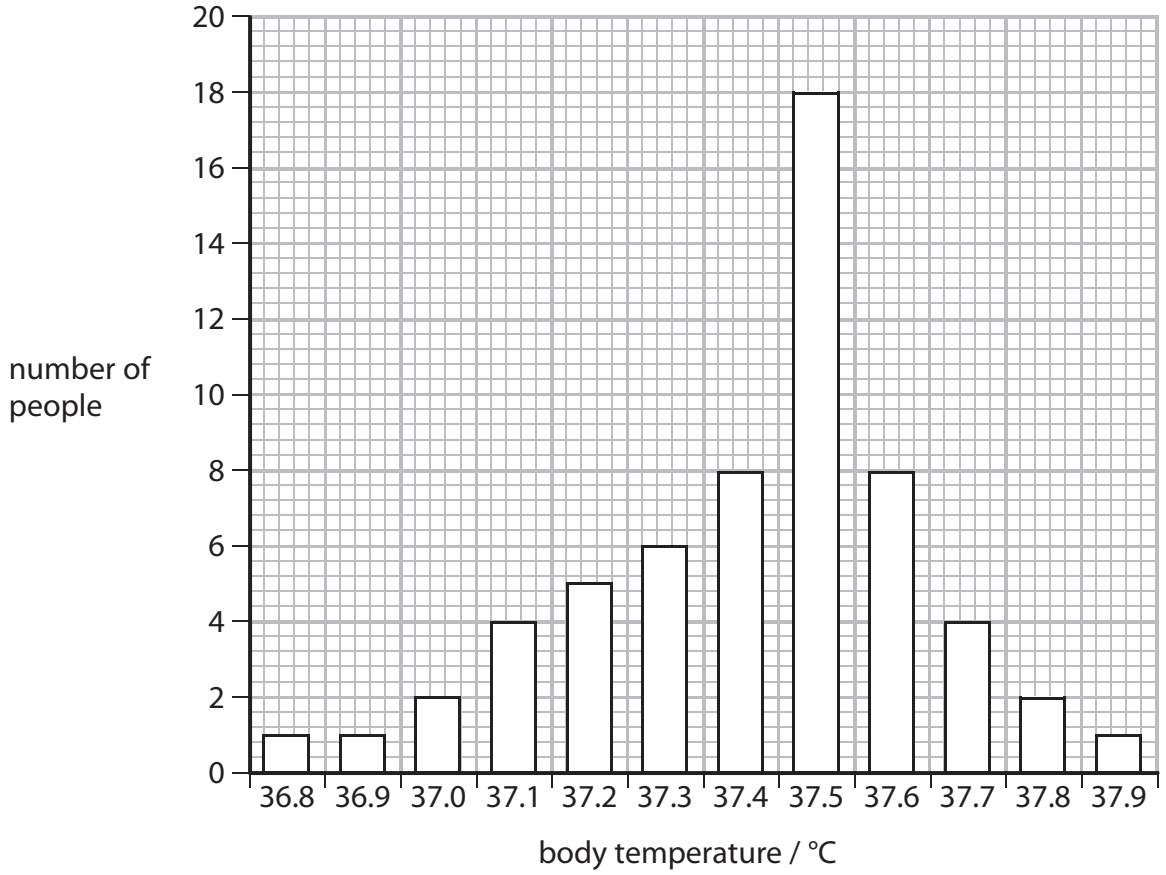
(Total for Question 2 = 8 marks)

Thermoregulation

3 (a) The graph shows the body temperature of 60 people.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The range in body temperature is

(1)

☒ **A** 0.1

☒ **B** 1.1

☒ **C** 11.0

☒ **D** 11.1

(ii) State the type of variation, shown in the graph, that results in a normal distribution curve.

(1)

.....

(iii) Calculate the percentage of people with a body temperature of 37.5 °C.

(2)

answer = ... %

(b) A person with a body temperature of 37.9 °C had a body temperature of 37.5 °C one hour later.

(i) Explain how thermoregulation causes this reduction in body temperature.

(4)

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(ii) Explain how exercise can cause body temperature to increase.

(2)

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(Total for Question 3 = 10 marks)

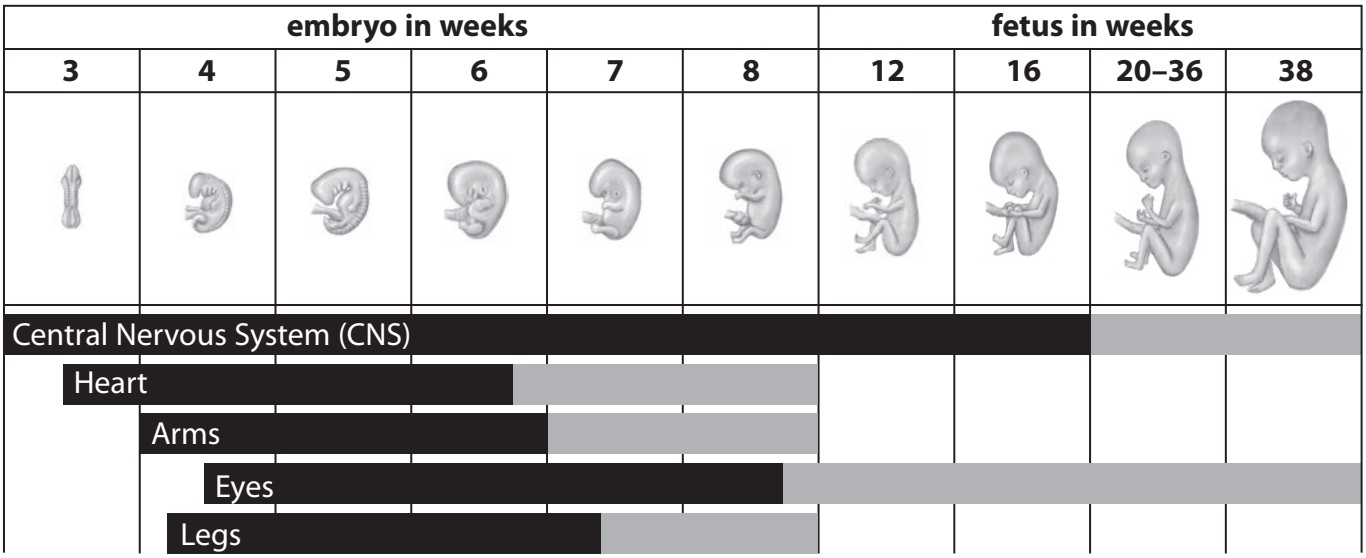
Alcohol abuse

4 Fetal alcohol syndrome occurs when a pregnant woman drinks large quantities of alcohol.

The diagram shows the development of the embryo and fetus during its time in the uterus.

The bars show the time period during which fetal alcohol syndrome can cause an abnormality in a specific body part.

The darker the bar, the more likely an abnormality will occur in that body part.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The body part most likely to be affected by fetal alcohol syndrome throughout pregnancy is the

(1)

☒ **A** central nervous system

☒ **B** heart

☒ **C** arms

☒ **D** eyes

(ii) State the period of time when a defect in the development of the legs is most likely to occur.

(1)

.....weeks

(b) (i) Alcohol is a drug.

Define the term **drug**.

(2)

(ii) Explain why alcohol is classed as a depressant.

(2)

(c) (i) Describe a long-term effect of alcohol abuse.

(2)

(ii) Discuss the ethics of allowing alcoholics to have an organ transplant.

(2)

(Total for Question 4 = 10 marks)

Genetic disorders

5 Cystic fibrosis (CF) is a recessive genetic disorder.

The recessive allele is shown as **f** and the dominant allele as **F**.

(a) (i) What is the genotype of a person with cystic fibrosis?

Put a cross (☒) in the box next to your answer.

(1)

- ☒ **A** **FF**
- ☒ **B** **Ff**
- ☒ **C** **fF**
- ☒ **D** **ff**

(ii) Explain why a person with cystic fibrosis (CF) may lose body mass.

(2)

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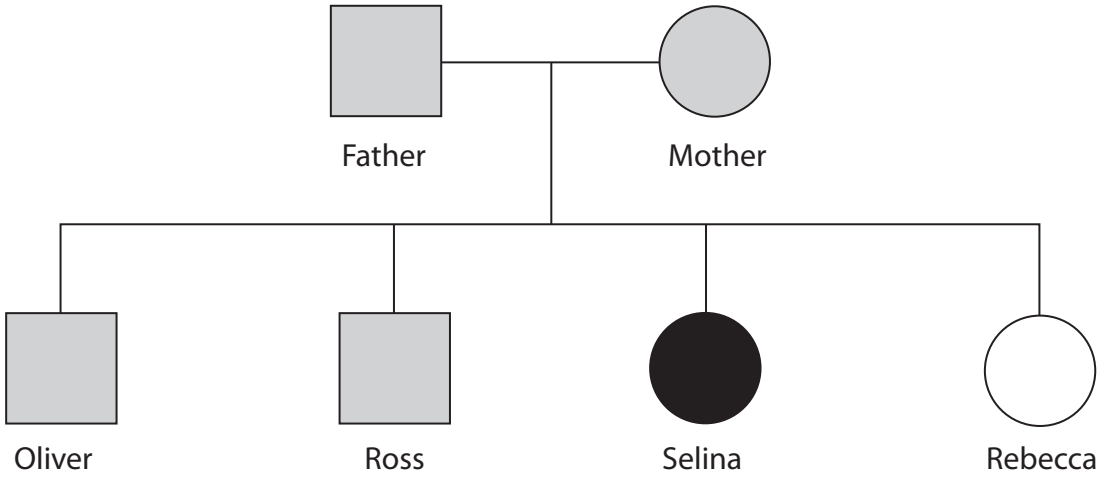
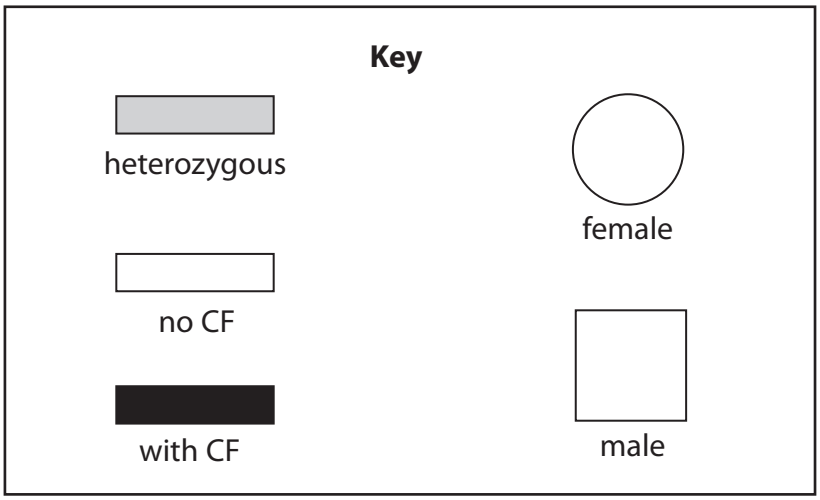
(b) The family pedigree shows the inheritance of cystic fibrosis (CF).

Both parents are heterozygous for CF.





(i) State what is meant by the term **heterozygous**.

(1)

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(ii) Explain why Rebecca does not have CF.

(2)

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*(c) Sickle cell disease is another genetic disorder caused by a recessive allele **(d)**.

Explain the inheritance of sickle cell disease in a family with a heterozygous father and a homozygous recessive mother.

You should use a genetic diagram or Punnett square and percentage outcomes in addition to your explanation.

(6)

(Total for Question 5 = 12 marks)

Messages in the body

6 (a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

A person with diabetes cannot control

(1)

- ☒ **A** the water content of their blood
- ☒ **B** the glucose content of their blood
- ☒ **C** their body temperature
- ☒ **D** their body mass index

(ii) Explain how Type 1 diabetes can be controlled.

(3)

(b) Adrian is 180 cm tall and has a mass of 120 kg.

A person who has a high Body Mass Index (BMI) is more likely to develop Type 2 diabetes.

Calculate Adrian's BMI using the equation.

$$\text{BMI} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

(2)

answer = ...

*(c) Body movement is controlled by nerve impulses.

Explain how impulses are transmitted in a reflex arc to prevent a person from injuring themselves.

(6)

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(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

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