Write your name here

| Surname | Other names |
|---|---|
| | |

**Edexcel Certificate**
**Edexcel International GCSE**

Centre Number | Candidate Number

# Biology

## Unit: KBI0/4BI0
## Paper: 2B

Friday 18 May 2012 – Morning
**Time: 1 hour**

Paper Reference
**KBI0/2B**
**4BI0/2B**

**You do not need any other materials.**

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.

*Turn over* ▶

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PEARSON

**Answer ALL questions.**

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

**Diet in children**

Doctors have warned that lifestyles of children are putting them at an increased risk of rickets. Rickets is caused by a deficiency of vitamin D. It affects the development of leg bones and was common in Britain many years ago. The disease is making a comeback because poor diet and a change in play habits have led to a vitamin D deficiency.

Children are spending more time indoors using computers compared with previous generations who spent time playing outside with their friends. Children who play outside are exposed to sunlight, which boosts vitamin D levels.

In addition, children are not being given cod liver oil – a rich source of the vitamin – in the same amounts as they were 50 years ago. Many parents used to give their children a spoonful of cod liver oil each day to supplement their diet. Two doctors have suggested that the vitamin should be added to milk and other food products to ensure children are getting the recommended amount. In Birmingham, the health authority has been offering pregnant women supplements of the vitamin to reduce the number of cases of rickets in the city.

Another concern is that families are not eating together, so children often choose their own food and prefer to snack on crisps, chocolate and soft drinks high in sugar. This means that the diet of many children is too high in fat and carbohydrates and contains more calories (energy) than the children need. Children are less active than in previous generations, so they don't use as many calories. This lack of activity may lead to other health problems.

(a) Suggest how spending time outdoors can reduce the chance of getting rickets (lines 7 and 8).

**(1)**

.....

.....

.....

(b) Suggest why vitamin D deficiency is more of a problem for children than for adults.

**(1)**

.....

.....

.....

(c) Vitamins are an essential part of a balanced diet.

Give **three** other components of a balanced diet.

**(3)**

1 .....

2 .....

3 .....

(d) Suggest why snacking on crisps, chocolate and soft drinks is an unsuitable diet for children who are not very active (lines 16 and 17).

**(2)**

.....

.....

.....

.....

.....

(e) Suggest the health problems that might develop if children have too much fat in their diet (line 18).

**(2)**

(f) Describe how you would carry out an experiment to find out the energy value of a potato crisp.

**(4)**

**(Total for Question 1 = 13 marks)**

**2** The passage describes how viruses can affect humans.

Complete the passage by writing a suitable word or words in each of the spaces.

**(7)**

Humans are affected by many viruses. Viruses only contain one sort of .....acid, either DNA or .....**.**

One virus, which causes the disease AIDS, is the ..... virus. People with AIDS are vulnerable to infection because their ..... system does not work so effectively. This means they are unable to produce .....blood cells that normally fight off infections by producing specific proteins called ..... that help to destroy pathogens.

Diseases caused by viruses can be prevented by injecting the body with an inactive form of the virus. The method of injecting is known as ..... and stimulates the body's defence system to produce memory cells.

**(Total for Question 2 = 7 marks)**

**3** For a woman to become pregnant, a sperm must fertilise one of her eggs. At the time the egg is released, the body temperature rises slightly.

A woman wanted to become pregnant. She measured her body temperature each day for 28 days, starting on the first day of her menstrual cycle.

The chart she kept is shown below.

| Day | Body temperature in °C |
|---|---|
| 1 | 36.8 |
| 2 | 36.8 |
| 3 | 36.8 |
| 4 | 36.7 |
| 5 | 36.8 |
| 6 | 36.7 |
| 7 | 36.7 |
| 8 | 36.7 |
| 9 | 36.7 |
| 10 | 36.6 |
| 11 | 36.7 |
| 12 | 36.7 |
| 13 | 36.7 |
| 14 | 36.7 |
| 15 | 37.0 |
| 16 | 37.0 |
| 17 | 37.0 |
| 18 | 37.1 |
| 19 | 37.1 |
| 20 | 37.0 |
| 21 | 37.0 |
| 22 | 37.0 |
| 23 | 37.0 |
| 24 | 37.0 |
| 25 | 37.0 |
| 26 | 37.0 |
| 27 | 37.0 |
| 28 | 36.9 |

(a) (i) What was the total number of days that the body temperature of the woman was below 37.0 °C?

**(1)**

.....

(ii) On which day was an egg probably released from her ovary?

**(1)**

.....

(iii) Suggest how the woman could accurately determine her body temperature.

**(2)**

.....

.....

(b) During the 28 days the ovary of the woman released two different hormones, A and B. The table shows some of the roles of these hormones.

| Hormone A | Hormone B |
|---|---|
| repairs uterus lining | maintains uterus lining |
| develops secondary sexual characteristics | prevents egg release |

(i) Name hormone A.

**(1)**

.....

(ii) Name hormone B.

**(1)**

.....

(iii) How do these hormones travel from the ovary to the uterus?

**(1)**

.....

(iv) Give **two** female secondary sexual characteristics.

**(2)**

1 .....

2 .....

**(Total for Question 3 = 9 marks)**

**4** The picture shows a sheep that has been genetically modified to contain a human gene for making a human protein in its milk.

The protein in its milk is a blood clotting substance called factor IX.

(a) The process of genetic modification used to produce this sheep involves the use of two types of enzyme. One enzyme cuts DNA and the other enzyme joins DNA. The process also used a vector.

(i) Name the enzyme that cuts DNA.

**(1)**

.....

(ii) Name the enzyme that joins DNA.

**(1)**

.....

(iii) Name a vector.

**(1)**

.....

(b) This sheep is transgenic.

What is meant by the term **transgenic**?

**(1)**

(c) The transgenic sheep can be reproduced by cloning.

Suggest the advantages of reproducing the transgenic sheep by cloning.

**(3)**

(d) (i) Name the small structures in normal plasma that are involved in blood clotting.

**(1)**

(ii) Explain why is it important to have blood that clots.

**(2)**

**(Total for Question 4 = 10 marks)**

**5** An investigation was carried out to find out the effect of fear on human heart rate.

Ten students measured their heart rate under normal conditions. The students were then given a fright and asked to measure their heart rate again.

The table shows their results.

| Student number | Heart rate in beats per minute | |
|---|---|---|
| | Normal conditions | When frightened |
| 1 | 70 | 80 |
| 2 | 65 | 85 |
| 3 | 59 | 66 |
| 4 | 66 | 75 |
| 5 | 57 | 66 |
| 6 | 60 | 68 |
| 7 | 63 | 67 |
| 8 | 72 | 72 |
| 9 | 62 | 74 |
| 10 | 70 | 77 |

(a) (i) Identify the student whose result was anomalous.

**(1)**

.....

(ii) Describe and explain the results of this investigation.

**(2)**

.....

.....

.....

.....

.....

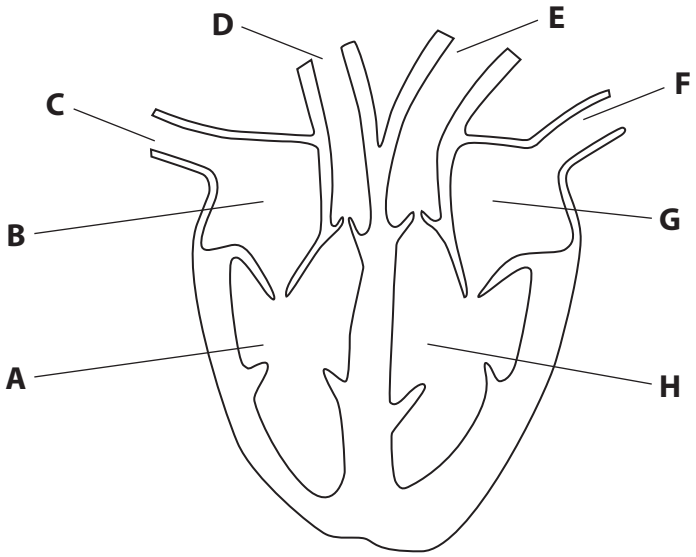
(iii) State, with a reason, whether the results of this investigation are reliable.

**(1)**

.....

.....

(b) The diagram shows the human heart with four chambers and four blood vessels labelled **A** to **H**.




Complete the table by writing in the label letter that matches the description of the structure.
The first one has been done for you.

**(4)**

| Structure | Label letter |
|---|---|
| the right atrium | **B** |
| the chamber that pumps blood to the lungs | |
| the chamber with the thickest muscle wall | |
| the blood vessel containing blood at the highest pressure | |
| the blood vessel carrying blood with the least oxygen to the heart | |

**(Total for Question 5 = 8 marks)**

**6** (a) Describe how the process of nitrification affects the availability of nitrates to plants.

**(2)**

(b) Some farmers grow legume plants such as clover in their fields. They then plough them into the soil before growing their cereal crops.

Suggest why they do this.

**(4)**

(c) Explain why only about 10% of the energy in the cereal crop is transferred to organisms that eat the crop.

**(2)**

**(Total for Question 6 = 8 marks)**

**7** Describe the biological consequences of cigarette smoking on the human lungs.

**(5)**

**(Total for Question 7 = 5 marks)**

**TOTAL FOR PAPER = 60 MARKS**

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