Write your name here

Surname	Other names

Pearson Edexcel Certificate
Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Unit: KBI0/4BI0
Paper: 2B

Friday 9 June 2017 – Morning
Time: 1 hour

Paper Reference
KBI0/2B
4BI0/2B

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.*
- 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.
- 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 ▶

P48392A

1/1/1/1/1/

P 4 8 3 9 2 A 0 1 1 6

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.

Omega-3

Excess lipids (fats and oils) in the human diet can increase the risk of health problems such as obesity, heart disease and strokes. However, a balanced diet needs to contain fats and oils because they are needed in the human body for many important functions.

Scientists have recently discovered that a type of fatty acid contained in oils can also benefit human health. The fatty acids that provide benefits to human health are called omega-3 fatty acids. A diet rich in these fatty acids is thought to lower blood pressure and reduce the risk of heart disease.

Fish oils are known to contain high levels of omega-3 fatty acids. Fish farmers know that the fish they produce are of more value to the consumer if they contain oils rich in omega-3. As a result, about 80% of the fish oil produced globally from the oceans is used as food in fish farms.

Small fish called anchovies live in our oceans. They eat microscopic plants called plankton that contain high levels of omega-3. As the anchovies grow, they also contain high levels of omega-3 in their oil. Fishing boats catch billions of these small fish, that are then ground up to be fed to bigger fish such as salmon, on fish farms.

Fish farms consume vast quantities of anchovies. The increase in the number of fish farms is one reason why wild fish stocks of anchovies are declining. It takes about 5 kg of anchovies to produce 1 kg of farmed salmon. The high cost of this source of fish oil has encouraged fish farmers to use less, so the fish they produce contain lower levels of omega-3 in their oil, which is not good for human health.

Recently, scientists have discovered another way to obtain high levels of omega-3 to feed to fish on fish farms. The scientists genetically modified a plant called *Camelina* to produce seeds containing omega-3 fatty acids. This discovery will enable these seeds to be fed to salmon in fish farms and could reduce overfishing of the oceans.

(a) Suggest how excess lipids (fats and oils) increase the risk of heart disease (lines 1 and 2).

(3)

(b) Fats and oils are large, insoluble molecules needed in a balanced diet (lines 2 and 3).

Give the names of two small, soluble molecules needed in a balanced diet.

(2)

1 .....

2 .....

(c) (i) State a function of lipid in the human body.

(1)

.....

.....

(ii) Fatty acids are one component of a lipid molecule.

Name another component.

(1)

.....

(d) Use the information in the passage to draw a food chain that includes anchovies (lines 13 to 17).

(2)

(e) Suggest why wild fish stocks are declining.

(2)

(f) Explain why 5 kg of anchovies only produce 1 kg of farmed salmon (line 20).

(3)

(g) The genetic modification of *Camelina* plants involves the use of enzymes and a vector (lines 24 and 25).

(i) Explain how enzymes are used in genetic modification.

(2)

.....

.....

.....

.....

(ii) Describe the role of a named vector in genetic modification.

(2)

.....

.....

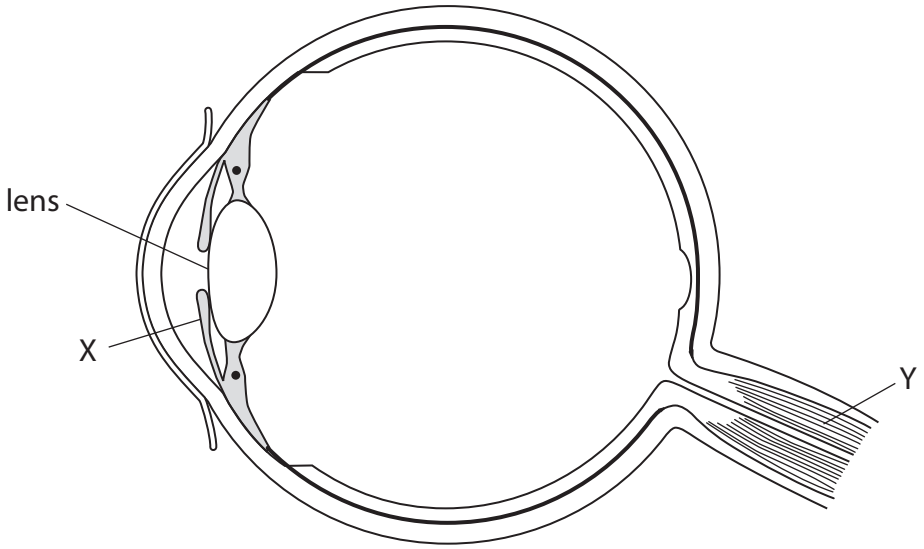
.....

.....

(Total for Question 1 = 18 marks)

BLANK PAGE

2 The diagram shows a section of a human eye.



(a) (i) Explain how part X prevents damage to the retina in very bright light.

(2)

.....

.....

.....

.....

(ii) Explain why damage to part Y would affect the ability to see.

(2)

.....

.....

.....

.....

(b) In some people the lens in the eye becomes cloudy.

A cloudy lens is called a cataract.

(i) Explain how a cataract would affect the ability to see.

(2)

.....

.....

.....

.....

(ii) The population of the USA is 322 million, of which 47.0% are over 40 years of age.

17.2% of the people over the age of 40 develop a cataract.

Calculate the number of people in the USA over the age of 40 who develop a cataract.

(2)

number of people = ...

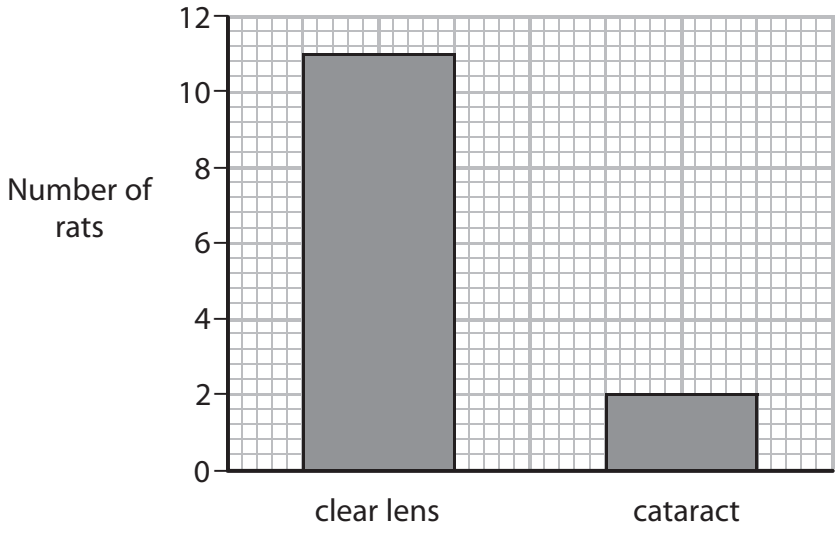
(c) Cataracts develop when proteins in the lens clump together.

Lanosterol is a chemical that helps to break up these clumps of protein.

In 2015, scientists investigated the ability of lanosterol to cure cataracts. They put drops of lanosterol solution into the eyes of rats with cataracts.

After six days of treatment they counted the number of rats with a clear lens and the number of rats that still had cataracts.

The graph shows the results.



One conclusion from this investigation is that lanosterol cures cataracts in humans.

(i) Explain why some people might agree with this conclusion.

(2)

.....

.....

.....

.....

(ii) Give two reasons why some people do not agree with this conclusion.

(2)

1 .....

.....

.....

2 .....

.....

.....

(Total for Question 2 = 12 marks)

3 Plants produce seeds by sexual reproduction.

(a) (i) Fertilisation takes place before seeds are formed.

Name the structure that contains the male sex cells involved in this fertilisation.

(1)

(ii) Explain how young plants that grow from seeds are able to survive until photosynthesis can start.

(3)

(b) A student investigates the conditions needed for broad bean seeds to germinate.

He divides broad bean seeds into four groups, A, B, C and D.

He places each group of seeds in different conditions as shown in the table.

Group	Conditions
A	access to water, oxygen and at a temperature of 5 °C
B	access to water, oxygen and at a temperature of 15 °C
C	access to oxygen, no access to water and at a temperature of 15 °C
D	access to water, no access to oxygen and at a temperature of 15 °C

(i) Suggest how the student could identify when a seed has germinated.

(1)

(ii) Explain which group of seeds is likely to germinate first.

(4)

(Total for Question 3 = 9 marks)

4 Components of blood have different functions.

(a) Complete the table by giving the missing information.

(4)

Component	Function
red blood cells	
	engulf bacteria
platelets	
	transport vitamins and minerals

(b) When a person is vaccinated, their immune system produces memory cells.

Describe the role of memory cells.

(3)

(Total for Question 4 = 7 marks)

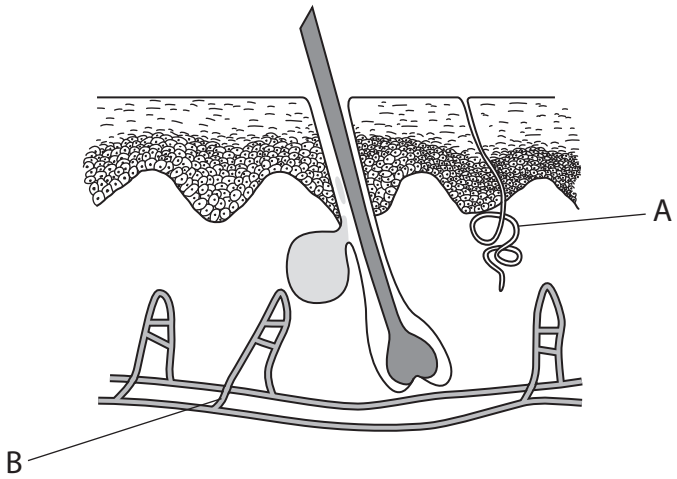
BLANK PAGE

5 (a) Name the process that maintains a constant internal environment in the body.

(1)

.....

(b) The diagram shows a section through human skin.



(i) Explain how part A helps a person to maintain a constant body temperature when they enter a warm place.

(3)

.....

.....

.....

.....

.....

.....

(ii) Explain how part B helps a person to maintain a constant body temperature when they enter a warm place.

(3)

.....

.....

.....

.....

.....

.....

(c) The body controls the water content of the blood.

(i) Name this process.

(1)

.....

(ii) Name the organ that controls the water content of the blood.

(1)

.....

(Total for Question 5 = 9 marks)

TURN OVER FOR QUESTION 6

6 (a) What is meant by the term **transgenic organism**?

(2)

(b) (i) Give an example of a current or potential use of a transgenic animal.

(1)

(ii) When a transgenic animal has been produced, it can then be cloned.

Explain the benefits of cloning this animal.

(2)

(Total for Question 6 = 5 marks)

TOTAL FOR PAPER = 60 MARKS