Write your name here

Surname	Other names

Pearson Edexcel
International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Human Biology

Unit: 4HB0
Paper: 02

Friday 10 January 2014 – Afternoon
Time: 1 hour

Paper Reference
4HB0/02

You must have:
Ruler
Candidates may use a calculator.

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 ▶

P42869A

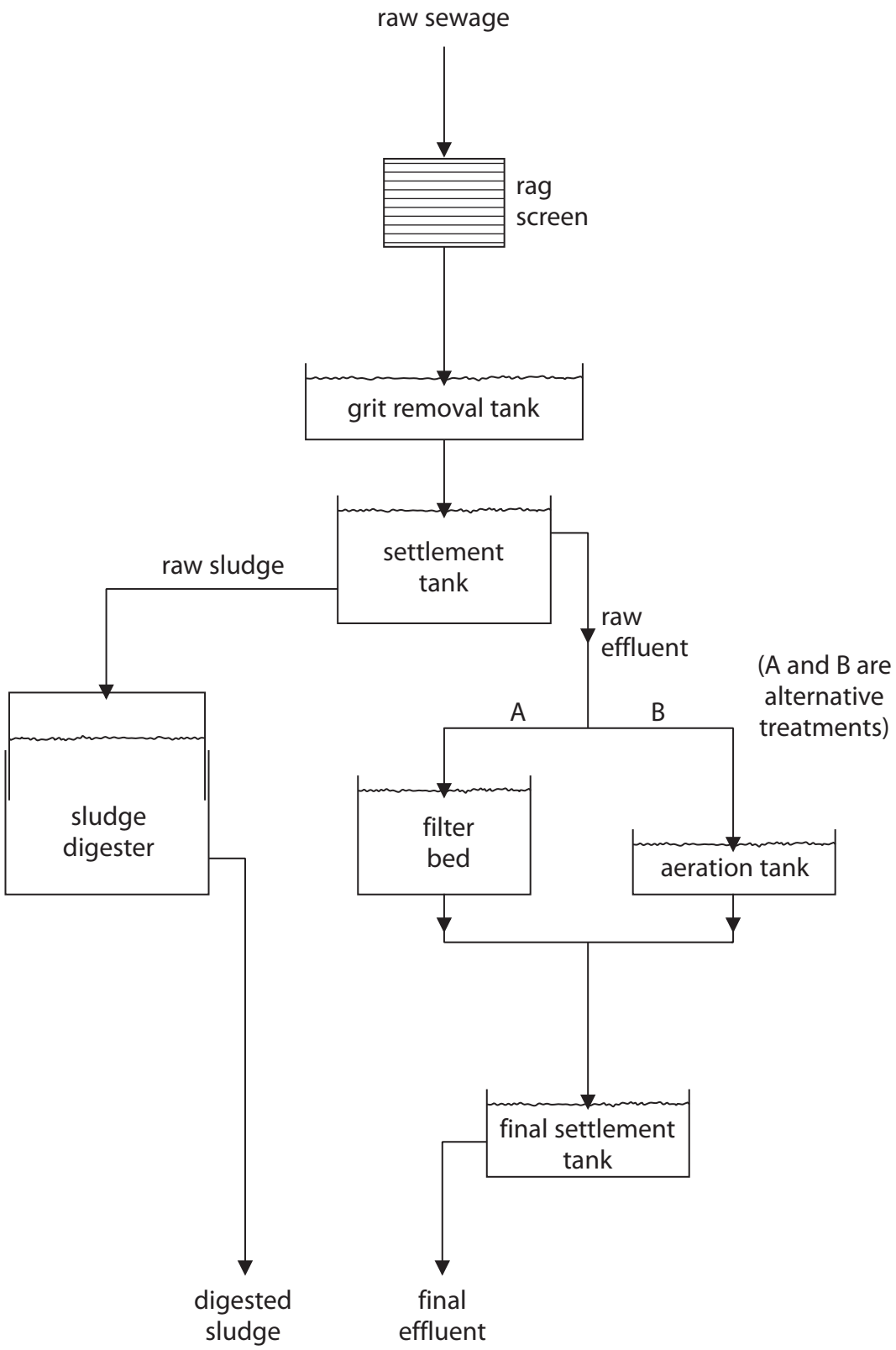
1/1/1/1/1/1/

P 4 2 8 6 9 A 0 1 1 6

PEARSON

Answer ALL questions.

1 The diagram shows some stages in the treatment of sewage at a sewage works.



(a) Using the diagram, name three stages in treating sewage where bacteria are essential.

(3)

1 .....

2 .....

3 .....

(b) Name the gas produced in the sludge digester stage that can be used as a fuel.

(1)

.....

(c) Suggest a possible use for the final digested sludge.

(1)

.....

(d) State the stage where anaerobic conditions are essential.

(1)

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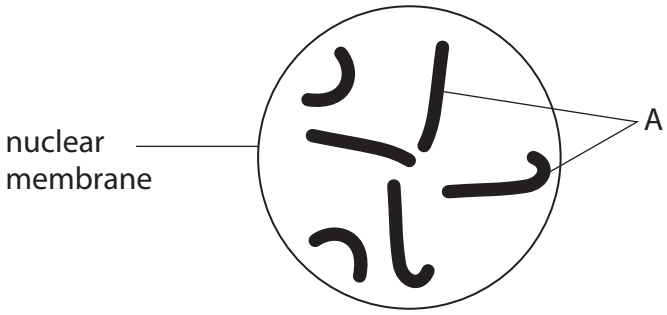
(Total for Question 1 = 6 marks)

2 The diagram shows the nucleus of a cell at the start of nuclear division.



Not to scale

(a) Name the structures labelled A

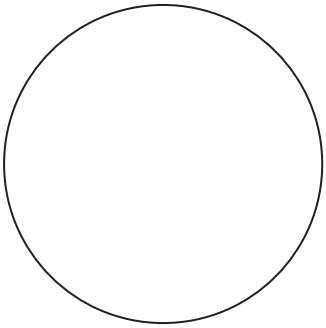
(1)

A .....

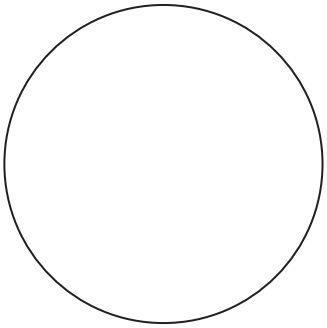
(b) Complete the diagrams below to show the structures in the nucleus of a daughter cell once the original nucleus has undergone:

(2)

- mitosis
- meiosis



mitosis



meiosis

(c) The structures labelled A contain deoxyribonucleic acid (DNA). Each molecule of DNA contains four types of base, one of which is guanine.

(i) Name the other three types of base.

(3)

1 .....

2 .....

3 .....

(ii) Name the base that pairs with guanine.

(1)

.....

(d) Haemophilia is a condition in which blood may not clot when it leaks from a damaged blood vessel.

It is said to be a sex-linked condition.

(i) Explain what is meant by the term **sex-linked**.

(1)

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.....

(ii) A woman who is a heterozygous carrier for haemophilia has a child with a man who does not have haemophilia.

What is the probability that their child will be a boy with haemophilia?

Draw a genetic diagram to show how you reached your answer. Use X^H as the allele for normal blood clotting and X^h as the allele for haemophilia.

(5)

(Total for Question 2 = 13 marks)

3 Some diseases can be spread by eating contaminated food. Explain precautions that can be taken to prevent the spread of food-borne diseases.

(8)

(Total for Question 3 = 8 marks)

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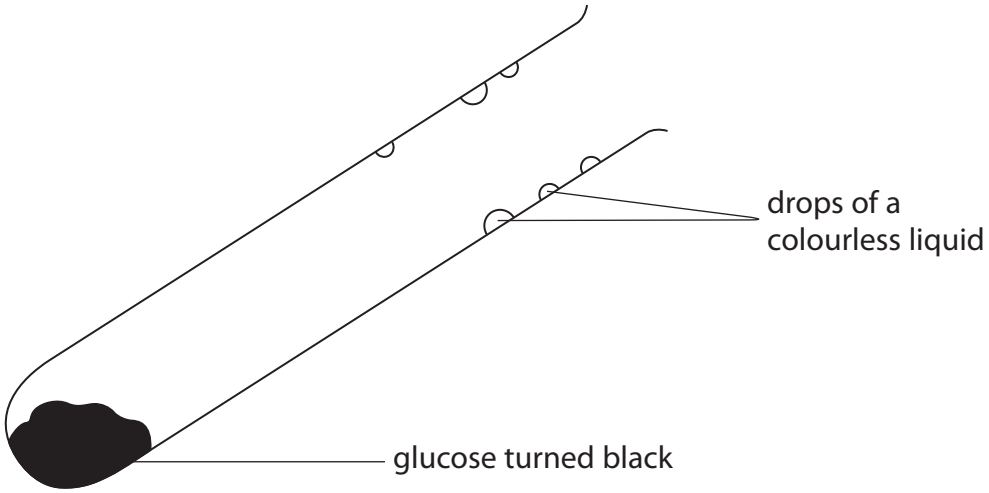
4 A student placed some glucose in a strong test tube and heated the test tube over a Bunsen flame.

The diagram shows his results.



(a) Suggest which element in the glucose caused the black colour.

(1)

.....

(b) The student thought that the drops of colourless liquid might be water.

Suggest how he could test his idea.

(2)

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(c) Suggest two safety precautions the student should take when heating the glucose.

(2)

1 .....

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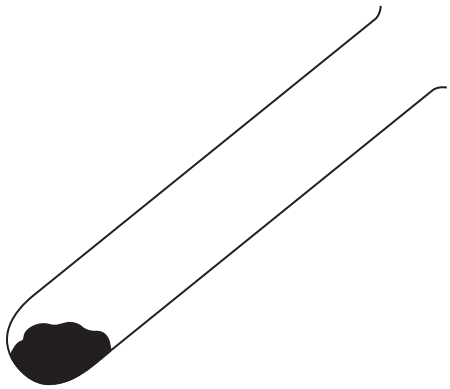
2 .....

.....

(d) The student thought that heating the glucose further might produce carbon dioxide.

(i) Using the diagram, draw and label changes you would make to the apparatus to find out if carbon dioxide is produced.

(4)



(ii) Describe the result you would expect to see if carbon dioxide was given off.

(1)

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(e) After further heating the student wanted to find out if any glucose remained in the test tube.

Describe how he should do this.

(3)

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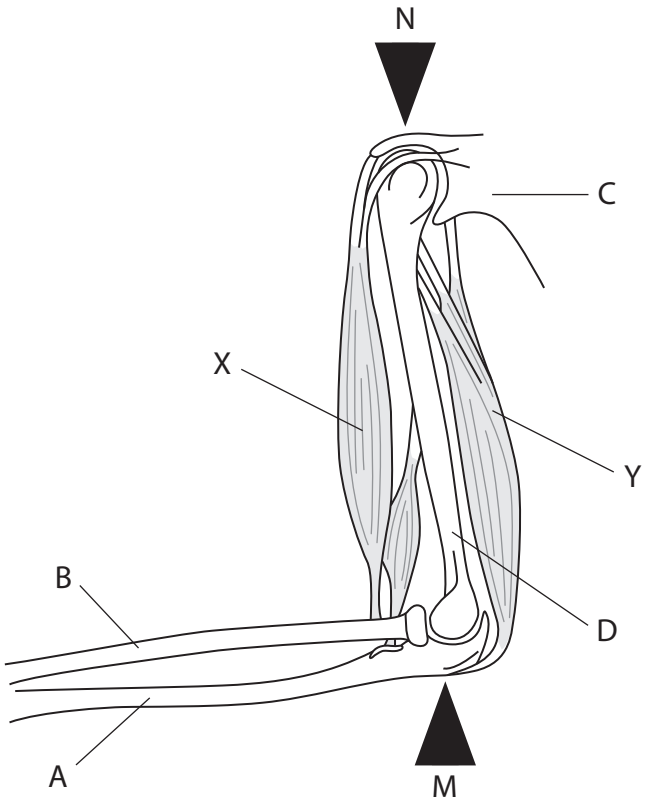
(Total for Question 4 = 13 marks)

5 The diagram shows the bones and some of the muscles of a human arm.



(a) Name the bones labelled A, B, C and D.

(4)

A .....

B .....

C .....

D .....

(b) Describe the functions of muscles X and Y in the movement of the forearm.

(4)

(c) Describe how the movement at joint M differs from the movement at joint N.

(2)

(Total for Question 5 = 10 marks)

6 Use the information in the following passage and your own knowledge to answer the questions that follow.

Malaria threatens 40% of the world's population. New approaches in the prevention and treatment of malaria may result from a study of a group of children in the South Pacific with a condition known as alpha thalassaemia. The symptoms of this disease are similar to a mild form of sickle cell anaemia and, like it, protect people from malaria.

Researchers found that children affected by alpha thalassaemia had more malaria attacks early in life, but that these attacks were relatively mild. Later in life, these children seemed to be immune to more severe malaria attacks whereas children unaffected by alpha thalassaemia often died.

(a) Explain how malaria is transmitted.

(3)

(b) Explain why malaria is more likely to be found in tropical regions.

(2)

(c) Using information in the passage, explain how alpha thalassaemia may have become common in tropical regions.

(2)

(d) Explain how infection with mild attacks of malaria may protect children against more severe attacks in later life.

(2)

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(e) Suggest why it has proved difficult to develop a successful vaccine against malaria.

(1)

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(Total for Question 6 = 10 marks)

TOTAL FOR PAPER = 60 MARKS

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