

Write your name here

Surname

Other names

**Pearson Edexcel**  
**International GCSE**

Centre Number

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Candidate Number

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# Human Biology

**Unit: 4HB0**

**Paper: 02**

Thursday 8 May 2014 – Morning

**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 ►

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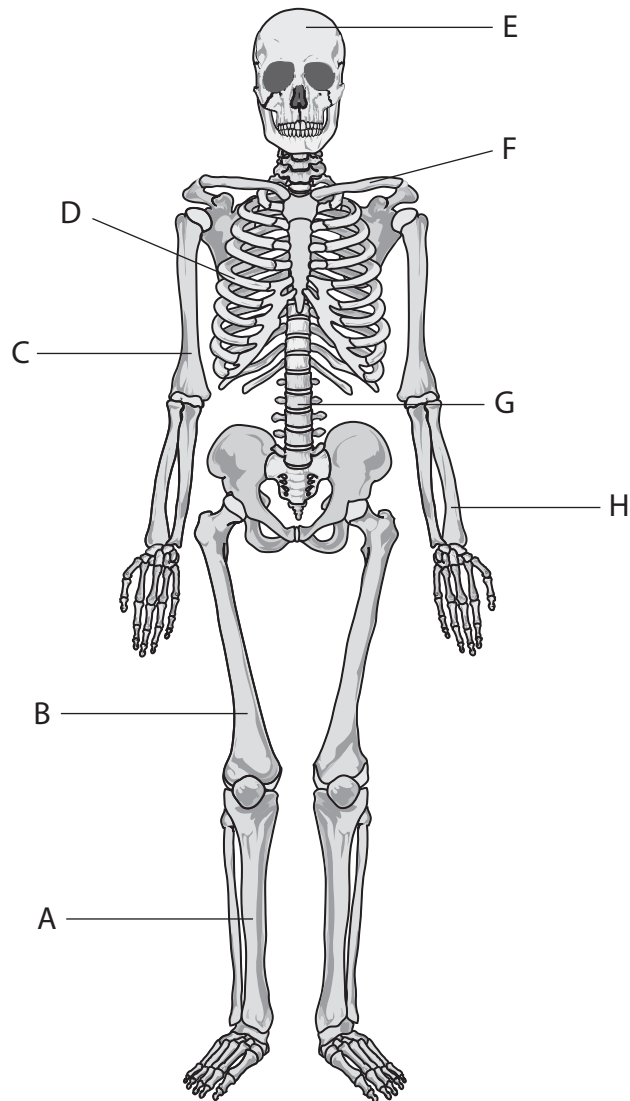
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**PEARSON**

**Answer ALL questions.**

**1** The diagram shows the human skeleton as viewed from the front.



(a) (i) Name the bones labelled C, D and F.

(3)

C .....

D .....

F .....

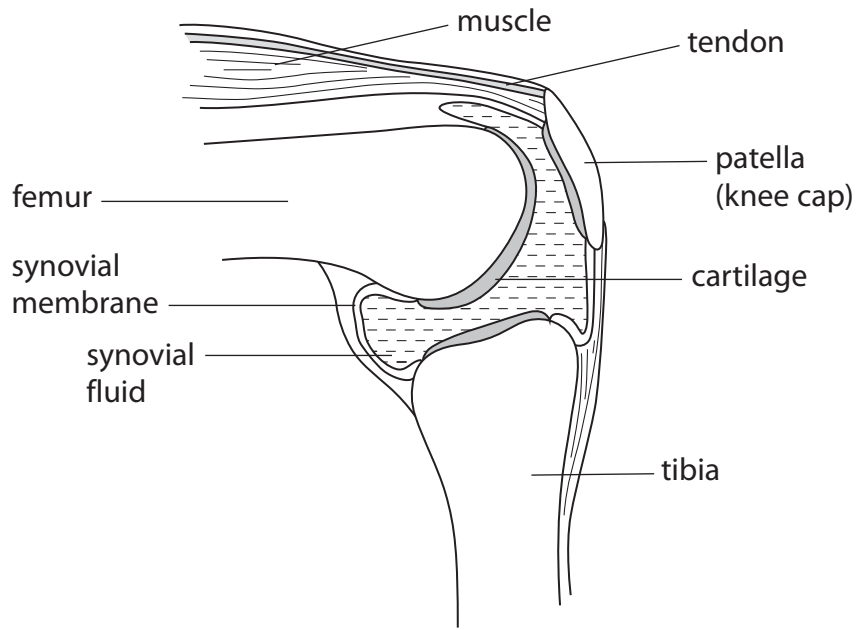
(ii) Write down the label letters for **two** bones that form part of the axial skeleton.

(2)

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(b) The diagram shows the knee joint, which is an example of a synovial joint.



(i) State the function of the following parts of the knee joint:

(3)

tendon .....

cartilage .....

synovial fluid.....

(ii) The knee joint is also an example of a hinge joint.

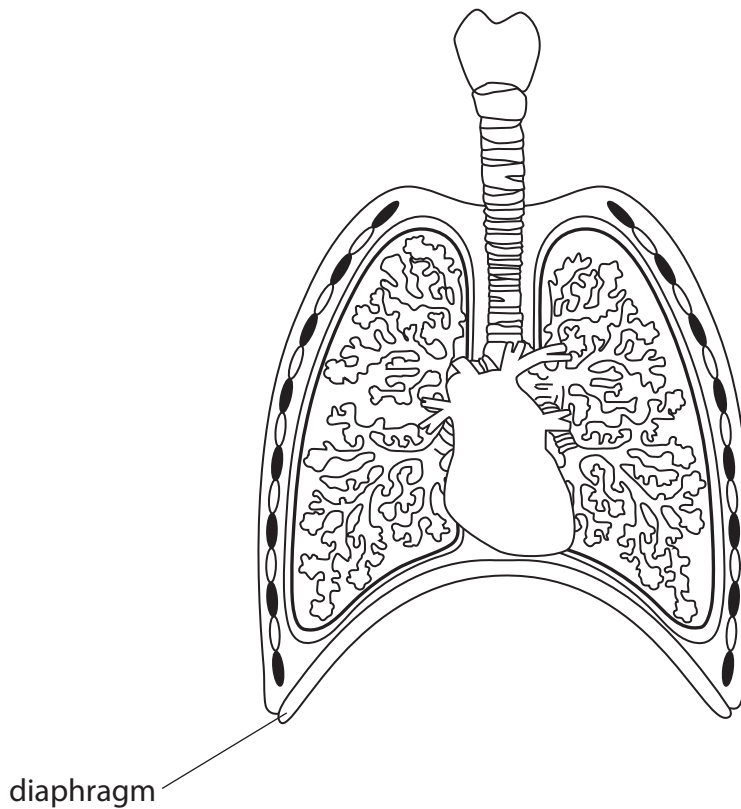
Describe the movement at a hinge joint.

(2)

(Total for Question 1 = 10 marks)



2 The diagram shows a human thorax.



(a) (i) Using the letter **T** and a line, label the trachea on the diagram.

(1)

(ii) Explain how the structure of the trachea enables it to perform its function.

(3)

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(b) The diagram shows the position of the diaphragm when a person has just breathed out.

(i) Describe the changes that occur to the diaphragm when a person breathes in. (2)

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(ii) Explain how these changes enable air to enter the lungs. (2)

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(c) Breathing out enables a person to get rid of carbon dioxide.

Describe how you could show that the air a person breathes out contains more carbon dioxide than the air a person breathes in. (3)

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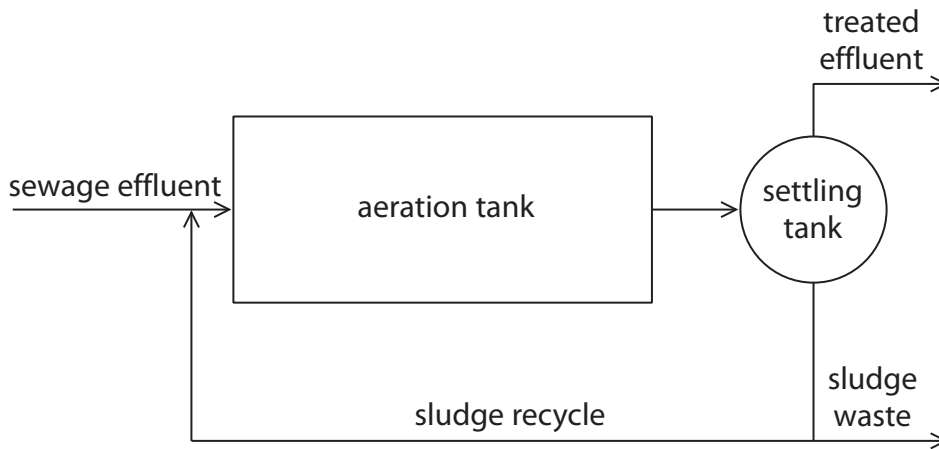
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**(Total for Question 2 = 11 marks)**



3 Humans produce many tonnes of sewage effluent each year. In most countries sewage effluent is treated before it enters rivers or seas.

(a) A common method for treating sewage is the activated sludge treatment. This is shown in the diagram.



(i) Explain the purpose of adding bacteria in the activated sludge treatment.

(3)

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(ii) Suggest a use for the sludge waste.

(1)

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(b) Explain why it is important that raw, untreated sewage should not enter rivers or the sea.

(4)

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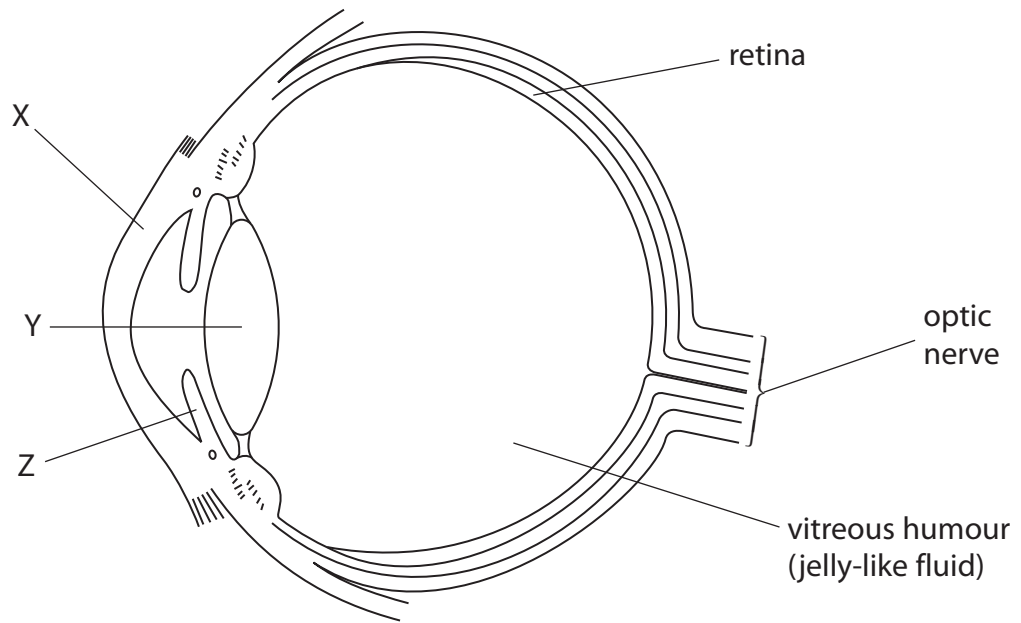
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**(Total for Question 3 = 8 marks)**



4 The diagram shows a section through the human eye.



(a) Complete the table with the names and functions of parts X, Y and Z.

(4)

Part	Name of part	Function of part
X		refracts light
Y	lens	
Z		

(b) Name the part of the brain to which the optic nerve goes.

(1)

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- (c) The vitreous humour helps to keep the retina in place at the back of the eye. However, sometimes the retina can become detached from the back of the eye and moves forward a little.

Suggest how a detached retina would affect vision.

(2)

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- (d) Humans and many other animals have stereoscopic vision, allowing them to see an object with two eyes at the same time. This is said to help them judge the distance of the object more accurately than if they look at the object with just one eye.

Design an experiment to investigate whether stereoscopic vision has this effect in humans.

(5)

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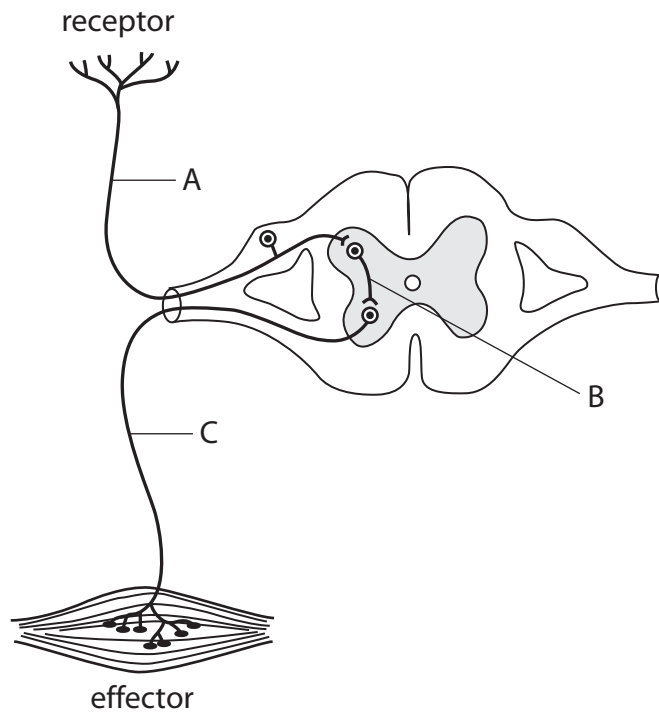
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**(Total for Question 4 = 12 marks)**



5 The diagram shows a reflex arc.



(a) (i) Name the type of neurone labelled C.

(1)

(ii) Draw an arrow on the diagram to show the direction of the impulse in neurone A.

(1)

(iii) Name the gap between neurones A and B.

(1)

(b) A scientist measured the speed of impulse along six neurones with different diameters.

The table shows the results he obtained.

Diameter of neurone in micrometres	Speed of impulse in metres per second
2	14
4	28
6	40
8	48
10	54
12	58



(i) Describe the relationship between the diameter of a neurone and the speed of impulse.

(2)

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(ii) Comment, with a reason, on the reliability of the scientist's results.

(2)

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(c) Suggest why the speed of conduction is up to 50 times faster in myelinated neurones than in unmyelinated neurones.

(2)

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**(Total for Question 5 = 9 marks)**



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

**Dialysis or kidney transplant?**

1 Dialysis and kidney transplants are treatments for severe renal failure and chronic kidney disease.

The most common type of dialysis involves blood being pumped through a dialysis machine to remove waste products and excess fluids. Dialysis is usually carried out

5 at a hospital three times a week and takes about four hours per session. This may mean that it is difficult for the person to continue working. Low blood pressure is the most common complication of dialysis, although this can be treated. Sometimes the access points from the dialysis machine can become infected or cause blood clots.

10 A kidney transplant can completely take over the function of the failing kidneys and is considered the treatment of choice, rather than dialysis. Survival rates and the quality of life are often better than in people who use dialysis. However, there is a shortage of organs available for donation. A kidney can come from a living relative, a living unrelated person, or from a person who has died. When  
15 a potential kidney donor is found for someone who is waiting for a transplant, tissue typing is done to see how closely the donor's antigens match those of the recipient.

In addition, blood types must also be compatible. A kidney from a donor with blood group O can be transplanted into a person with any blood type. A kidney

20 from a donor with blood group AB can only be transplanted into another person who has blood group AB. A person who has blood group AB can receive a kidney from a person with any blood group.

(a) Explain why renal failure and chronic kidney disease require treatment (lines 1 and 2).

(2)

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(b) Explain which form of treatment, a kidney transplant or dialysis, you would recommend to someone who has kidney disease.

(4)

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(c) When a person has a kidney transplant it is important to check the blood group of the donor and the recipient.

Explain why a person with blood group AB can only donate a kidney to another person who has blood group AB, but can receive a kidney from a person with any blood group (lines 19 to 22).

(4)

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**(Total for Question 6 = 10 marks)**

**TOTAL FOR PAPER = 60 MARKS**



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