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Human Biology

Unit: 4HB0

Paper: 02

Friday 13 May 2016 – 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.
- 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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Answer ALL questions.

- 1 There are many different substances in the human body and they have different features.

Draw lines to join each feature to any substances it applies to.

Each feature may apply to one or more substances.

(7)

Feature

produced during respiration ●

excreted by the lungs ●

formed in the large intestine ●

gives a positive Benedict's test ●

found in the nucleus and forms genes ●

formed by processes of ultrafiltration and reabsorption ●

nitrogen containing compound excreted by the kidneys ●

Substance

● carbon dioxide

● faeces

● glucose

● urea

● urine

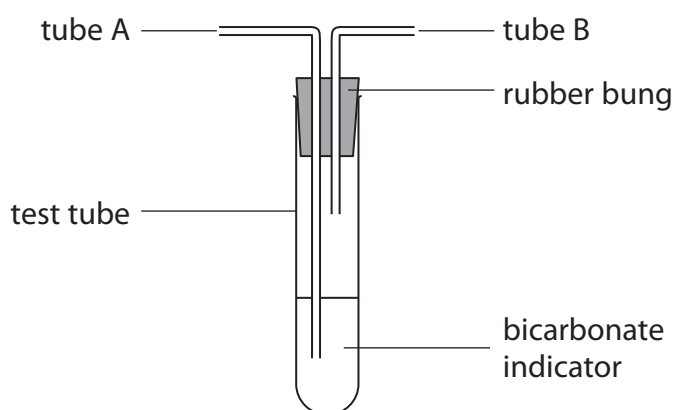
● DNA

(Total for Question 1 = 7 marks)



- 2 A student carries out an investigation to compare the carbon dioxide content of inhaled and exhaled air.

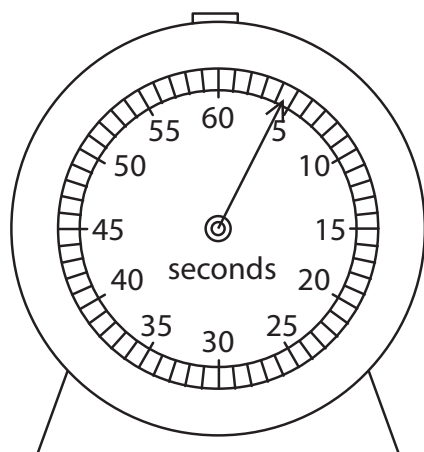
The diagram shows the apparatus used. Bicarbonate indicator is used to show the presence of carbon dioxide. The gas changes the colour of the bicarbonate indicator from red to yellow.



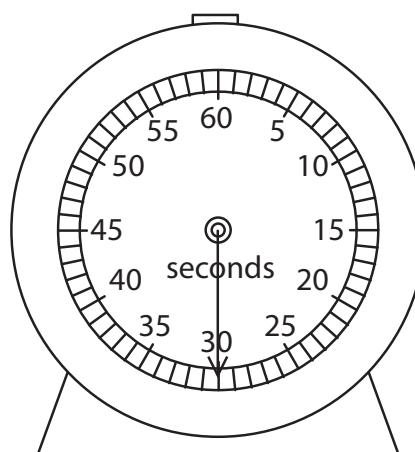
The following two experiments are carried out.

- 1) The student breathes out into tube A until the bicarbonate indicator turns yellow.
- 2) The bicarbonate indicator is replaced and the student breathes in through tube B until the indicator turns yellow.

The time taken for the bicarbonate indicator to change from red to yellow is shown in the diagrams.



experiment 1



experiment 2

- (a) (i) What is the time taken for the bicarbonate indicator to change from red to yellow in each experiment?

(2)

time taken in experiment 1 = s

time taken in experiment 2 = s



(ii) How much longer does it take for the bicarbonate indicator to change colour in experiment 2, compared with experiment 1?

(1)

difference in time = s

(iii) Explain why there is a difference between the two times.

(2)

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(iv) Suggest a safety precaution that the student should observe during the experiments.

(1)

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(v) Explain why it is better to use bicarbonate indicator in these experiments rather than limewater.

(2)

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(b) The student exercises for five minutes and then repeats the investigation.

(i) Complete the table by placing a tick (✓) in the correct box for each experiment to show how the times after exercise compare with the times before exercise.

(2)

| | Longer time | Shorter time | Same time |
|--------------|-------------|--------------|-----------|
| experiment 1 | | | |
| experiment 2 | | | |

(ii) Explain why you think that the student will obtain these results.

(3)

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(Total for Question 2 = 13 marks)



3 Describe the life cycle of Schistosoma.

(8)

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Handwriting practice area consisting of multiple horizontal dotted lines for writing.

(Total for Question 3 = 8 marks)



- 4 (a) The words in the box name some of the parts of the male and female reproductive systems.

| | | | |
|------------|-----------------|--------|---------|
| epididymis | seminal vesicle | testis | uterus |
| ureter | vagina | vulva | urethra |
| | | | ovary |

Complete the table using the word or words that match the description in the first column.

(5)

| Description | Word |
|---|------|
| duct that carries both urine and sperm | |
| produces sperm | |
| where the fertilised ovum implants | |
| produces part of the seminal fluid | |
| where sperm is deposited during intercourse | |

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(b) Describe the functions of the following female hormones.

(i) Follicle-stimulating hormone (FSH)

(2)

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(ii) Oestrogen

(2)

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(iii) Oxytocin

(2)

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(Total for Question 4 = 11 marks)



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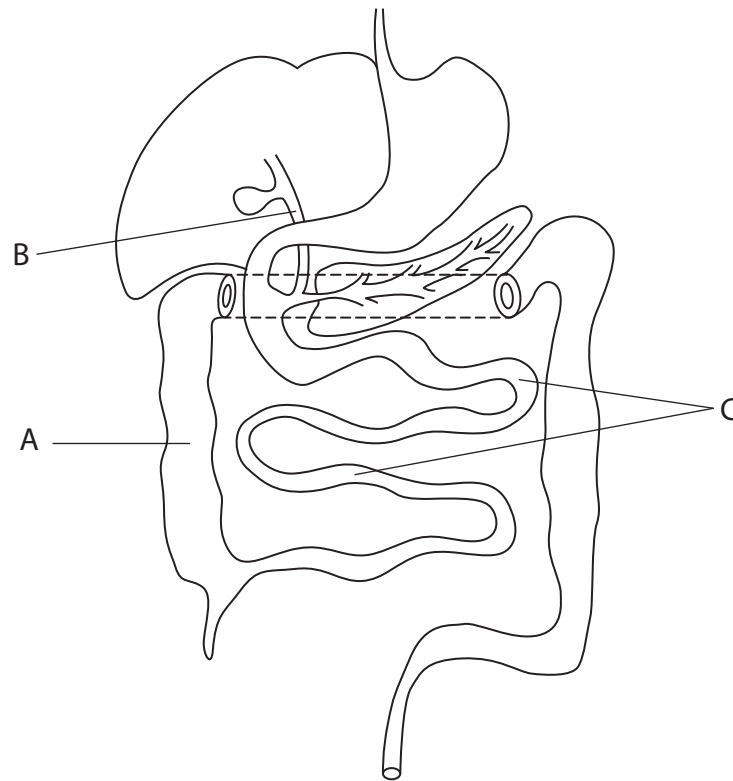


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5 The diagram shows part of the human digestive system.



(a) (i) Name structures A and C. (2)

A

C

(ii) Name the solution that passes down duct B. (1)

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(b) Duct B sometimes becomes blocked.

Suggest what effects this might have on the process of digestion.

(4)

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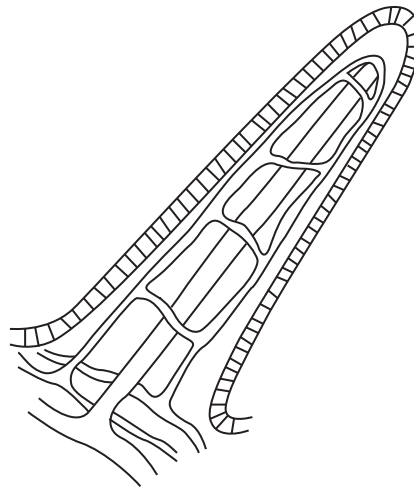


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(c) The diagram shows a villus that is present in structure C of the digestive system.



The size of the villi is reduced in people with coeliac disease.

Suggest how someone with coeliac disease is likely to be affected.

(3)

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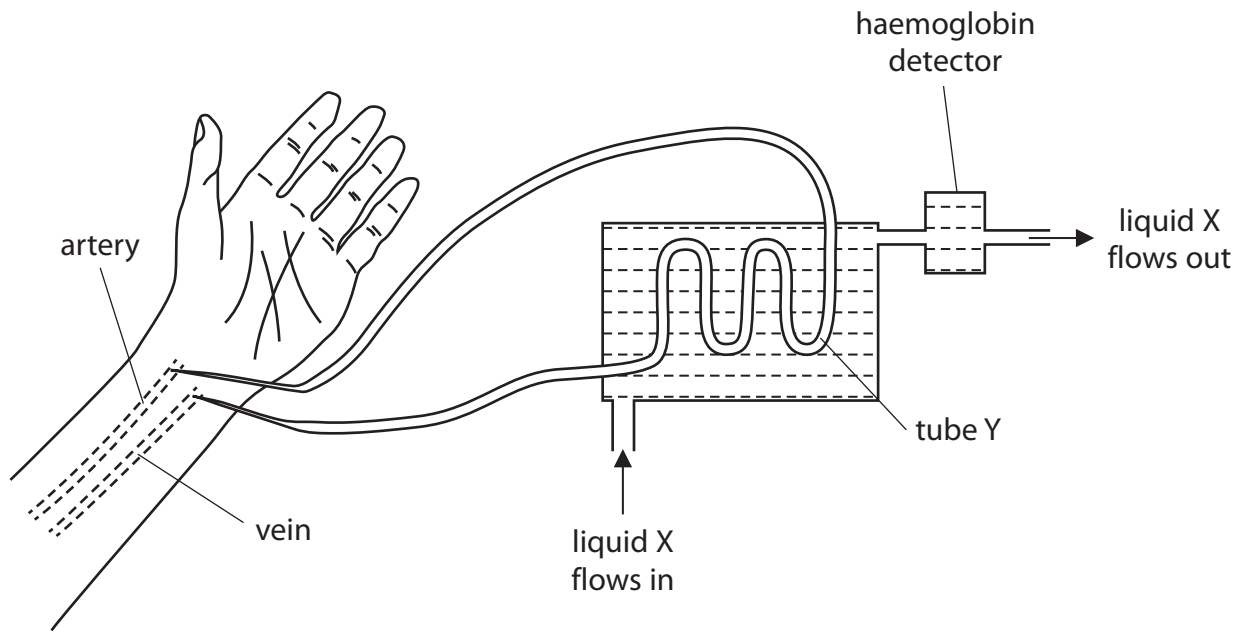
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(Total for Question 5 = 10 marks)



6 The diagram shows a simplified kidney dialysis machine.



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(a) Using arrows on the diagram, show the direction of blood flow in the artery and vein. (1)

(b) Tube Y is made of a material that only allows small molecules to leave the blood. Tube Y is performing the same function as part of the real kidney tubule.

(i) Name this part of the kidney tubule. (1)

(ii) Explain why tube Y would need to be several metres long in the kidney machine. (2)

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(c) Liquid X changes in composition as it flows through the machine.

Give two changes in composition.

(2)

1

2

(d) Glucose is added to liquid X before it flows into the machine.

Explain why glucose is added.

(3)

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(e) (i) State exactly where haemoglobin is found in the body.

(1)

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(ii) Suggest why there is a haemoglobin detector found at the point where liquid X flows out of the machine.

(1)

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(Total for Question 6 = 11 marks)

TOTAL FOR PAPER = 60 MARKS



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