

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2005



BIOLOGY A (MODULAR)
Moving and Feeding (Module 19)

346019

Tuesday 28 June 2005 Morning Session

In addition to this paper you will require:

- a black ball-point pen;
- an answer sheet.

You may use a calculator.

Time allowed: 30 minutes

Instructions

- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title “Moving and Feeding” printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only. Rough work may be done on the question paper.

Instructions for recording answers

- Use a **black ball-point pen**.

- For each answer **completely fill in the circle** as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

- Do **not** extend beyond the circles.

- If you want to change your answer, **you must** cross out your original answer, as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown:

1	2	3	4
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Information

- The maximum mark for this paper is 36.

Advice

- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

SECTION A

Questions **ONE** to **FIVE**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows a knee joint.

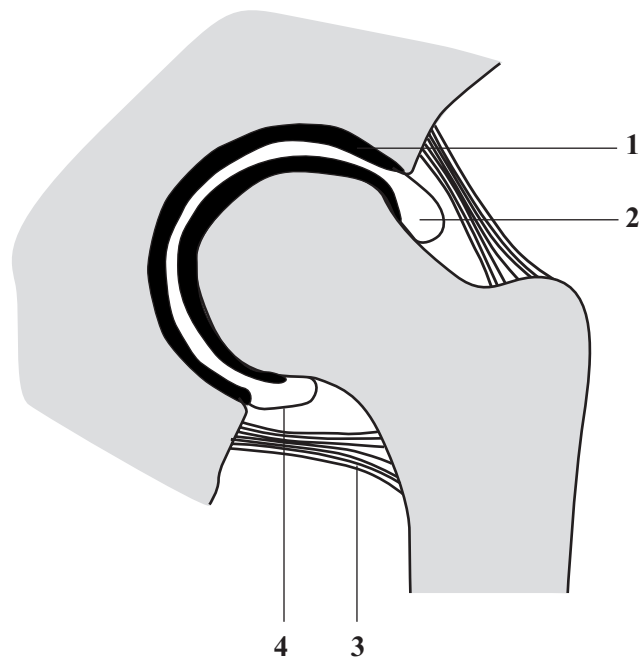
Match words from the list with the labels **1–4** on the diagram.

cartilage

ligament

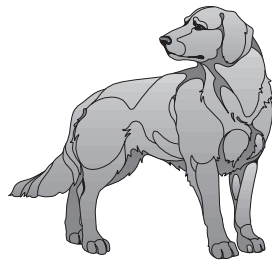
membrane

synovial fluid



QUESTION TWO

Animals feed using a variety of feeding methods.

**1****2****3****4**

(Drawings are **not** to the same scale.)

Match words from the list with the drawings **1–4**.

feeds by filtering water

feeds using a needle-like tube

has teeth adapted to eat various foods

is a carnivorous feeder

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION THREE

The table lists features of some of the tissues that make up the human skeleton.

Match words from the list with the numbers **1–4** in the table.

bones

ligaments

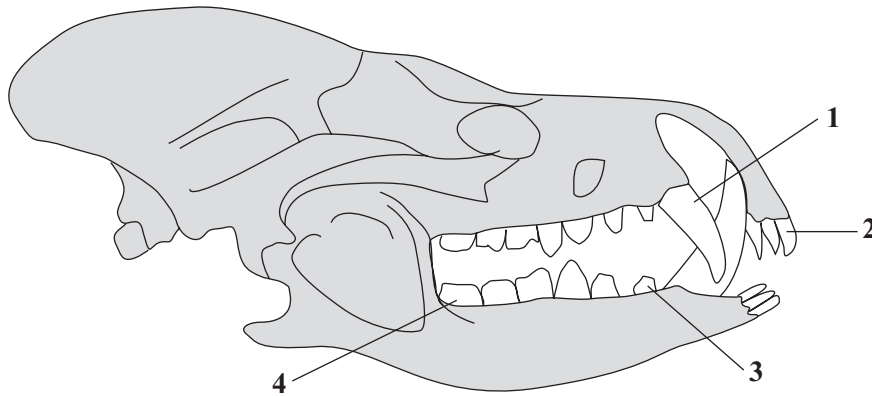
membranes in the joints

muscles

Tissue	Feature
1	hold the skeleton together at joints
2	made of fibres which can contract
3	provide support for the body
4	secrete an oily fluid

QUESTION FOUR

The drawing shows the skull of a fossil animal.



Match words from the list with the labels **1–4** on the drawing.

canine tooth

incisor tooth

molar tooth

premolar tooth

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION FIVE

Birds are adapted for movement through air.

Match words from the list with the numbers 1–4 in the table.

body

bones

feathers

wings

Structure	Adaptation for flight
1	honey-combed to reduce weight
2	light and have a large surface area
3	push downwards to provide lift
4	streamlined to reduce air resistance

NO QUESTIONS APPEAR ON THIS PAGE

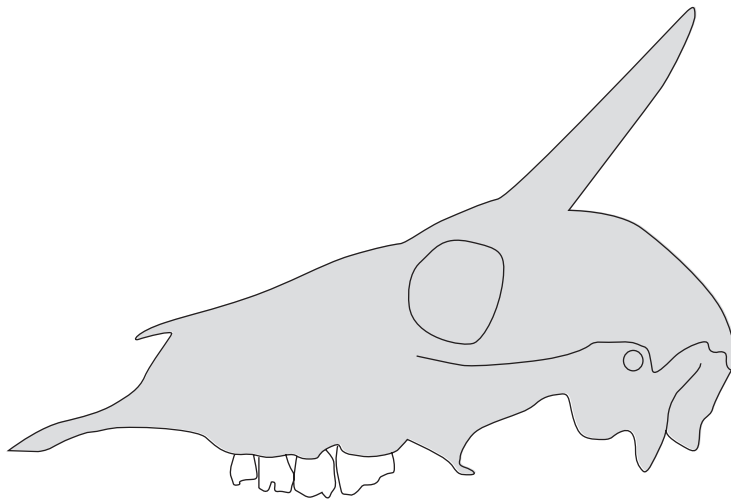
TURN OVER FOR THE NEXT QUESTION

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SECTION BQuestions **SIX** and **SEVEN**.In these questions choose the best **two** answers.Do **not** choose more than two.Mark your choices on the answer sheet.

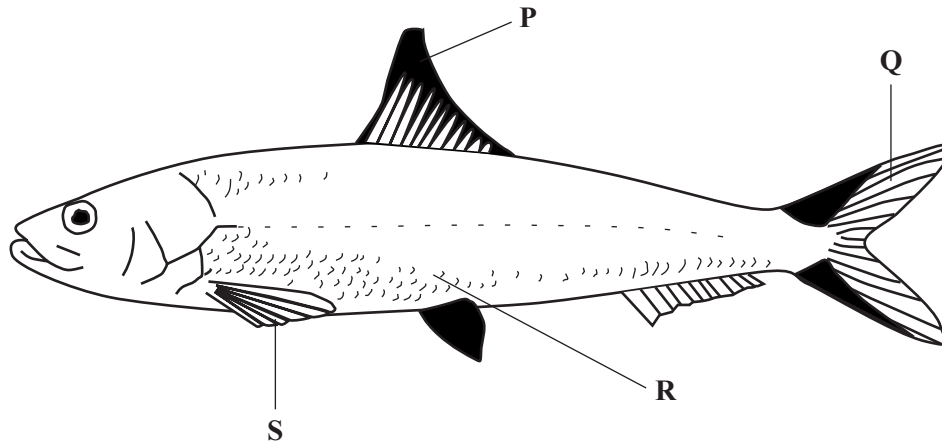
QUESTION SIX

The drawing shows the upper jaw of a springbok.

Which **two** of the following are present in the upper jaw of this animal?**carnassial teeth****teeth used to chew food****teeth used to crush food****teeth used to grip prey****teeth used to pull food apart**

QUESTION SEVEN

The drawing shows a fish.



Which **two** of the following would move the fish forward?

- fin P moving from side to side**
- fin Q moving up and down**
- fin Q pushing backwards against the water**
- fin S moving up and down**
- muscles at R contracting and relaxing**

TURN OVER FOR THE NEXT QUESTION

Turn over ►

SECTION CQuestions **EIGHT** to **TEN**.

Each of these questions has four parts.

In each part choose only **one** answer.Mark your choices on the answer sheet.

QUESTION EIGHT

Exercise is important in maintaining a healthy body.



- 8.1** A toned muscle is
- A** fully contracted.
 - B** slightly tensed.
 - C** stiff.
 - D** torn.
- 8.2** Which process releases energy in the muscles when a person is running?
- A** Circulation
 - B** Contraction
 - C** Relaxation
 - D** Respiration

- 8.3** An increase in muscle activity means that
- A** the muscles need less carbon dioxide.
 - B** the muscles need more glucose.
 - C** the muscles release more oxygen.
 - D** the rate at which heat is removed from the muscles decreases.
- 8.4** A sprain occurs when
- A** a bone is fractured.
 - B** ligaments are torn.
 - C** tendons are severed.
 - D** the cartilage is bruised.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

Mussels are a type of shellfish which live in the sea and obtain their food from the sea.

9.1 What do mussels feed on?

- A** Other shellfish
- B** Plankton
- C** Seaweed
- D** Small fish

9.2 Mussels produce a feeding current and then trap their food from this.

What do the mussels use to produce the feeding current?

- A** A suction tube
- B** Cilia
- C** Gills
- D** Muscles

9.3 The mussel's food is trapped by

- A** the cilia.
- B** the gills.
- C** the mouth.
- D** the muscles.

9.4 Once inside the mussel, the food is moved to the mouth by

- A** contraction of the muscles.
- B** movement of the cilia.
- C** suction from the mouth.
- D** the wave-like motion of the gills.

NO QUESTIONS APPEAR ON THIS PAGE

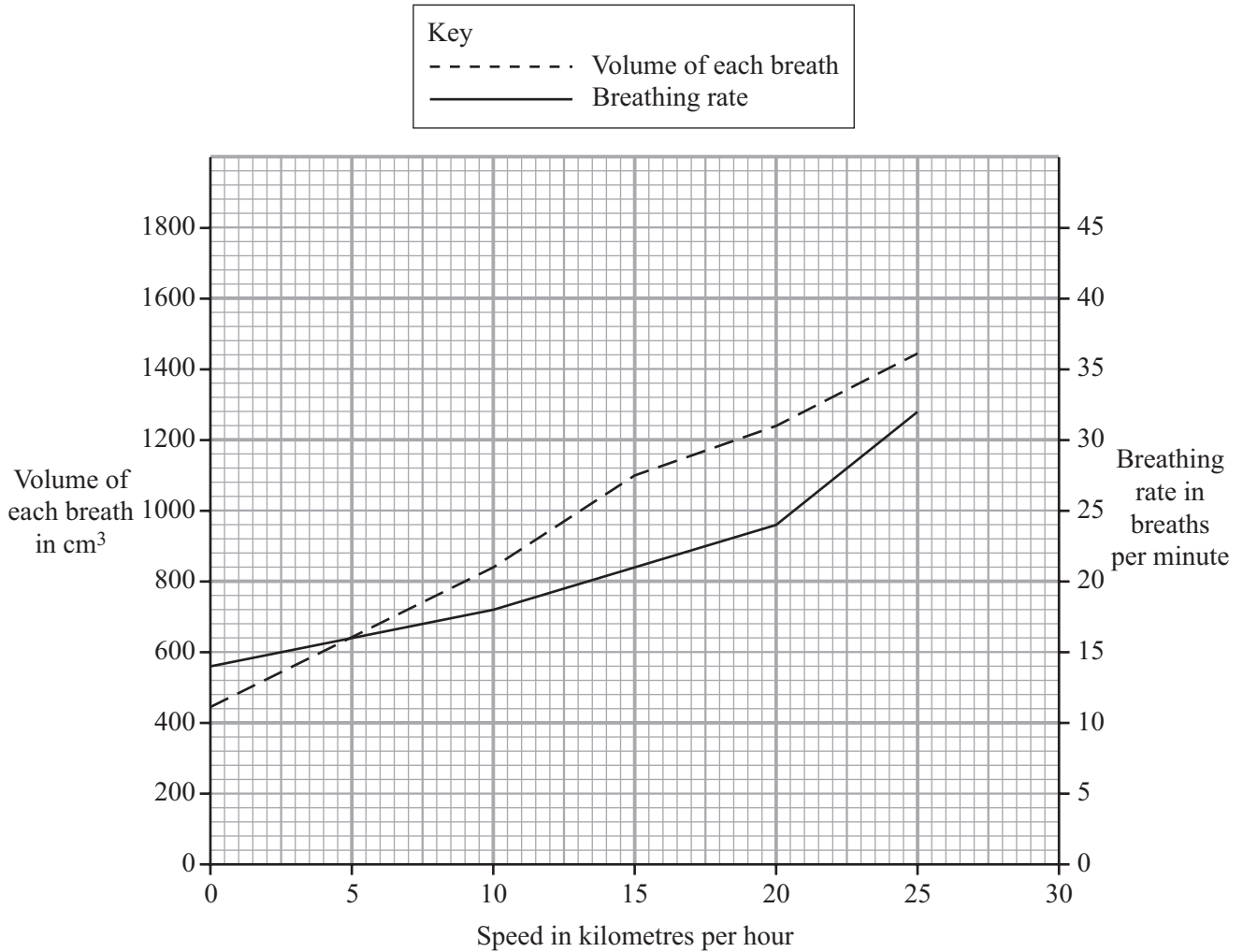
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QUESTION TEN

An investigation was carried out to find how the speed of an athlete affects the breathing rate and the volume of each breath taken.

The graph shows the results of the investigation.



10.1 What was the volume of each breath when the athlete was running at 15 kilometres per hour?

- A 21 cm³
- B 27.5 cm³
- C 1025 cm³
- D 1100 cm³

10.2 How did the athlete's breathing change as the speed increased from 0 kilometres per hour to 20 kilometres per hour?

- A The breathing rate increased from 9 to 32 breaths per minute
- B The breathing rate increased from 14 to 29 breaths per minute
- C The volume of each breath increased by 600 cm^3
- D The volume of each breath increased by 800 cm^3

10.3 What was the total volume of air breathed into the lungs each minute when the athlete was running at 10 kilometres per hour?

- A $13\,500 \text{ cm}^3$
- B $14\,400 \text{ cm}^3$
- C $15\,120 \text{ cm}^3$
- D $810\,000 \text{ cm}^3$

10.4 As breathing rate and volume of each breath increase, more oxygen enters the blood.

Which of these occurs as a result of this?

- A More carbon dioxide reaches the muscles
- B More oxygen reaches the muscles
- C The muscles become stiff
- D The tendons and ligaments become tensed

END OF TEST

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

SECTION A

Questions **ONE** and **TWO**.

In these questions match the words in the list with the numbers.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

Birds are adapted for movement through air.

Match words from the list with the numbers **1–4** in the table.

body

bones

feathers

wings

Structure	Adaptation for flight
1	honey-combed to reduce weight
2	light and have a large surface area
3	push downwards to provide lift
4	streamlined to reduce air resistance

QUESTION TWO

A joint occurs where two bones meet.

Match words from the list with the numbers 1–4 in the table.

bone

cartilage

ligament

tendon

Structure	Feature
1	is able to absorb shock because it can be slightly compressed
2	is attached to a muscle
3	is hardened by deposits of calcium phosphate
4	is slightly elastic and prevents dislocation

TURN OVER FOR THE NEXT QUESTION

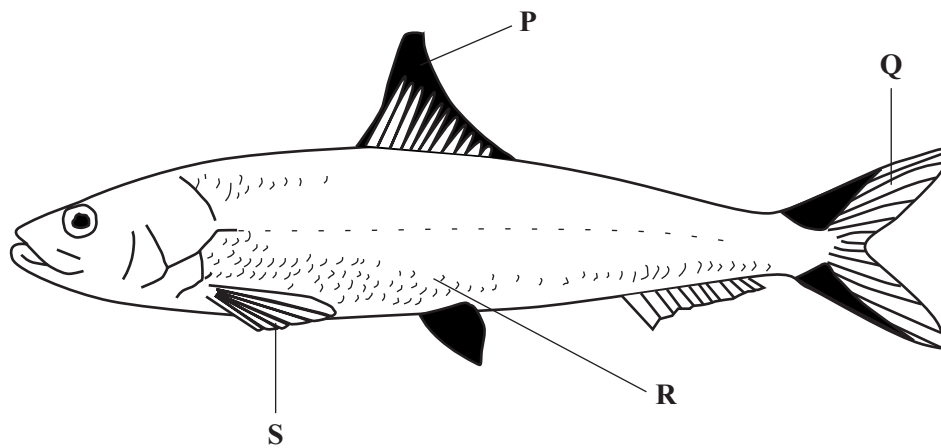
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SECTION BQuestions **THREE** and **FOUR**.In these questions choose the best **two** answers.Do **not** choose more than two.

Mark your choices on the answer sheet.

QUESTION THREE

The drawing shows a fish.

Which **two** of the following would move the fish forward?

- fin P moving from side to side**
- fin Q moving up and down**
- fin Q pushing backwards against the water**
- fin S moving up and down**
- muscles at R contracting and relaxing**

QUESTION FOUR

Which **two** of the following are features of sheep and cows?

they eat their own faeces

they have bacteria in their gut which can digest cellulose

they have teeth adapted to crush food

they lack a rumen

they produce a cellulose-digesting enzyme

TURN OVER FOR THE NEXT QUESTION

Turn over ►

SECTION CQuestions **FIVE** to **TEN**.

Each of these questions has four parts.

In each part choose only **one** answer.Mark your choices on the answer sheet.

QUESTION FIVE

Exercise is important in maintaining a healthy body.

**5.1** A toned muscle is

- A fully contracted.
- B slightly tensed.
- C stiff.
- D torn.

5.2 Which process releases energy in the muscles when a person is running?

- A Circulation
- B Contraction
- C Relaxation
- D Respiration

- 5.3** An increase in muscle activity means that
- A** the muscles need less carbon dioxide.
 - B** the muscles need more glucose.
 - C** the muscles release more oxygen.
 - D** the rate at which heat is removed from the muscles decreases.
- 5.4** A sprain occurs when
- A** a bone is fractured.
 - B** ligaments are torn.
 - C** tendons are severed.
 - D** the cartilage is bruised.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SIX

Mussels are a type of shellfish which live in the sea and obtain their food from the sea.

6.1 What do mussels feed on?

- A Other shellfish
- B Plankton
- C Seaweed
- D Small fish

6.2 Mussels produce a feeding current and then trap their food from this.

What do the mussels use to produce the feeding current?

- A A suction tube
- B Cilia
- C Gills
- D Muscles

6.3 The mussel's food is trapped by

- A the cilia.
- B the gills.
- C the mouth.
- D the muscles.

6.4 Once inside the mussel, the food is moved to the mouth by

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NO QUESTIONS APPEAR ON THIS PAGE

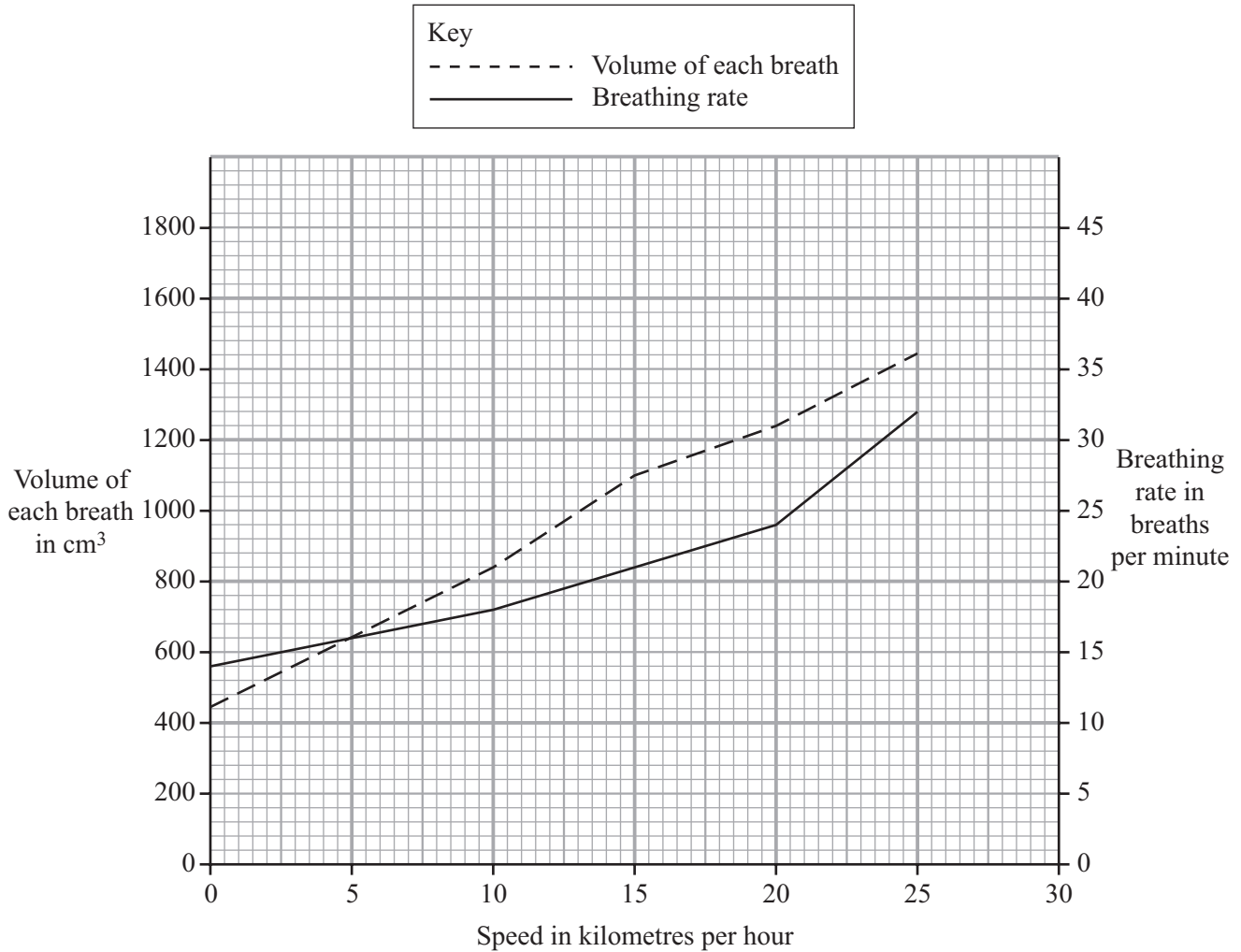
TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SEVEN

An investigation was carried out to find how the speed of an athlete affects the breathing rate and the volume of each breath taken.

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7.1 What was the volume of each breath when the athlete was running at 15 kilometres per hour?

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- 7.2 How did the athlete's breathing change as the speed increased from 0 kilometres per hour to 20 kilometres per hour?
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- 7.4 As breathing rate and volume of each breath increase, more oxygen enters the blood.
- Which of these occurs as a result of this?
- A More carbon dioxide reaches the muscles
 - B More oxygen reaches the muscles
 - C The muscles become stiff
 - D The tendons and ligaments become tensed

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION EIGHT

The table compares the digestive systems of two animals.

	Wild dogs	Sheep
Mouth		
Chewing of food	Unimportant	Important
Stomach		
Emptying time	3 hours	Never
Bacteria present	No	Yes
Cellulose digestion	No	Yes
Colon and Caecum		
Cellulose digestion	No	Yes
Bacteria present	Yes	Yes
Food absorbed	No	Large amount
Feeding habits		
Frequency	Intermittent	Continuous
Survival without		
Bacteria	Possible	Impossible
Plant foods	Possible	Impossible
Animal protein	Impossible	Possible

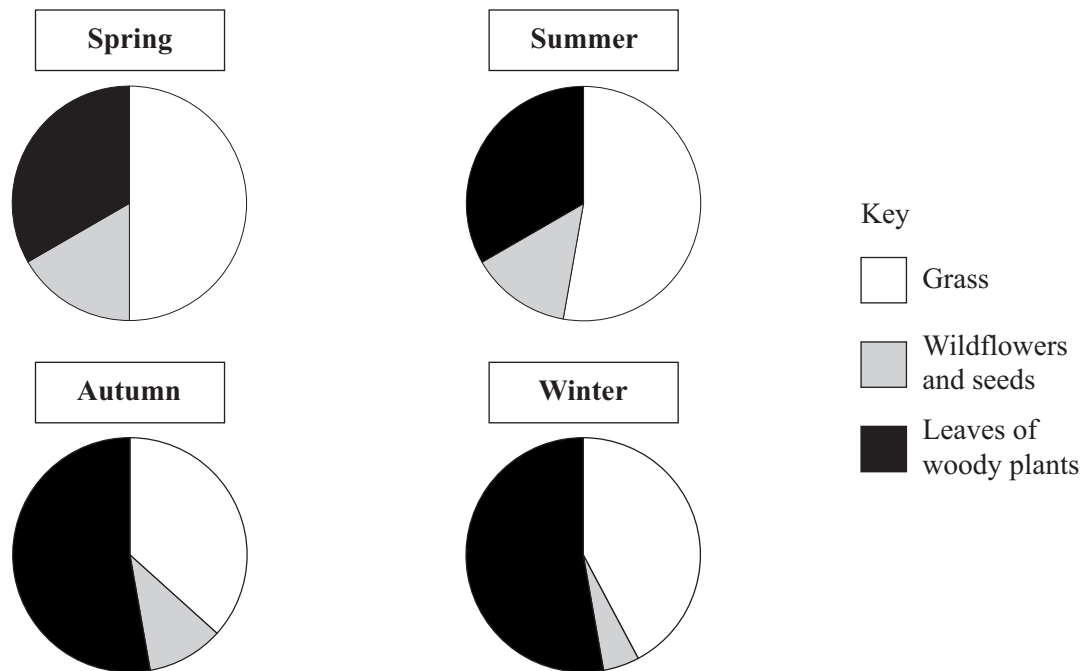
8.1 Which is the most likely explanation for the fact that sheep cannot survive without bacteria?

- A Large amounts of food are absorbed in the colon and caecum
- B The sheep's stomach never empties
- C Sheep can obtain sugar only from the breakdown of cellulose by bacteria
- D Sheep feed continuously

8.2 Which of the following indicates that dogs are carnivores?

- A Chewing of food is unimportant
- B They can survive without plant protein but not without animal protein
- C They cannot digest cellulose
- D The stomach empties after 3 hours

- 8.3** The pie charts show the proportions of the different types of food eaten by goats at different times of the year.



Which is the most likely reason for the change in the diet of the goat during the year?

- A Goats prefer grass
 - B Other animals eat most of the leaves of woody plants
 - C The availability of different types of food changes throughout the year
 - D There is less grass in summer than in autumn
- 8.4** Goats are described as ruminants. This means that they regurgitate their food from the rumen to the mouth and re-chew their food.

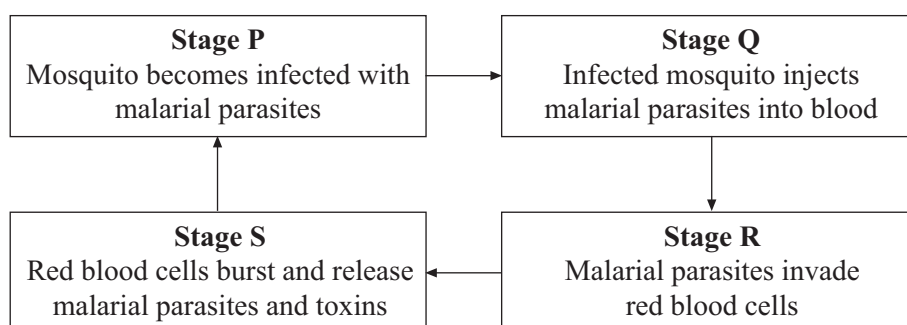
Why do goats re-chew their food?

- A It allows them to store cellulose from the plant cell walls
- B It makes digestion of cellulose from plant cell walls more efficient
- C The bacteria in the rumen do not produce a cellulose-digesting enzyme
- D They lack incisor teeth

Turn over ►

QUESTION NINE

The diagram shows stages in the life cycle of the malarial parasite.



9.1 Which stage causes severe fever in humans?

- A P
- B Q
- C R
- D S

9.2 Prevention of blood clotting occurs at stages

- A P and Q
- B P and R
- C P and S
- D Q and S

- 9.3** Mutualism is a relationship where
- A** one organism does not feed on another but causes harm.
 - B** one organism feeds on another and causes harm.
 - C** one organism feeds on another but does not cause harm.
 - D** two organisms benefit from living together.

- 9.4** The malarial parasite
- A** feeds by sucking fluids.
 - B** is a mosquito.
 - C** is a single-celled organism.
 - D** is found only in humans.

TURN OVER FOR THE NEXT QUESTION

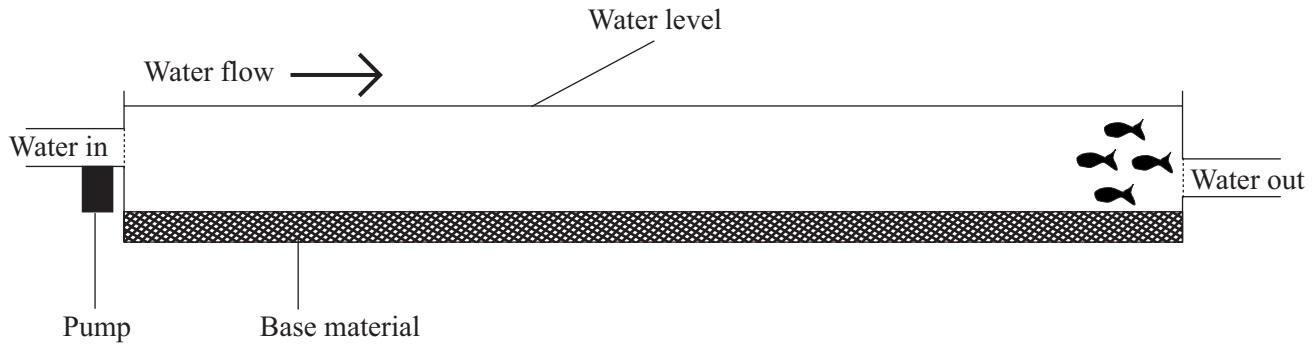
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QUESTION TEN

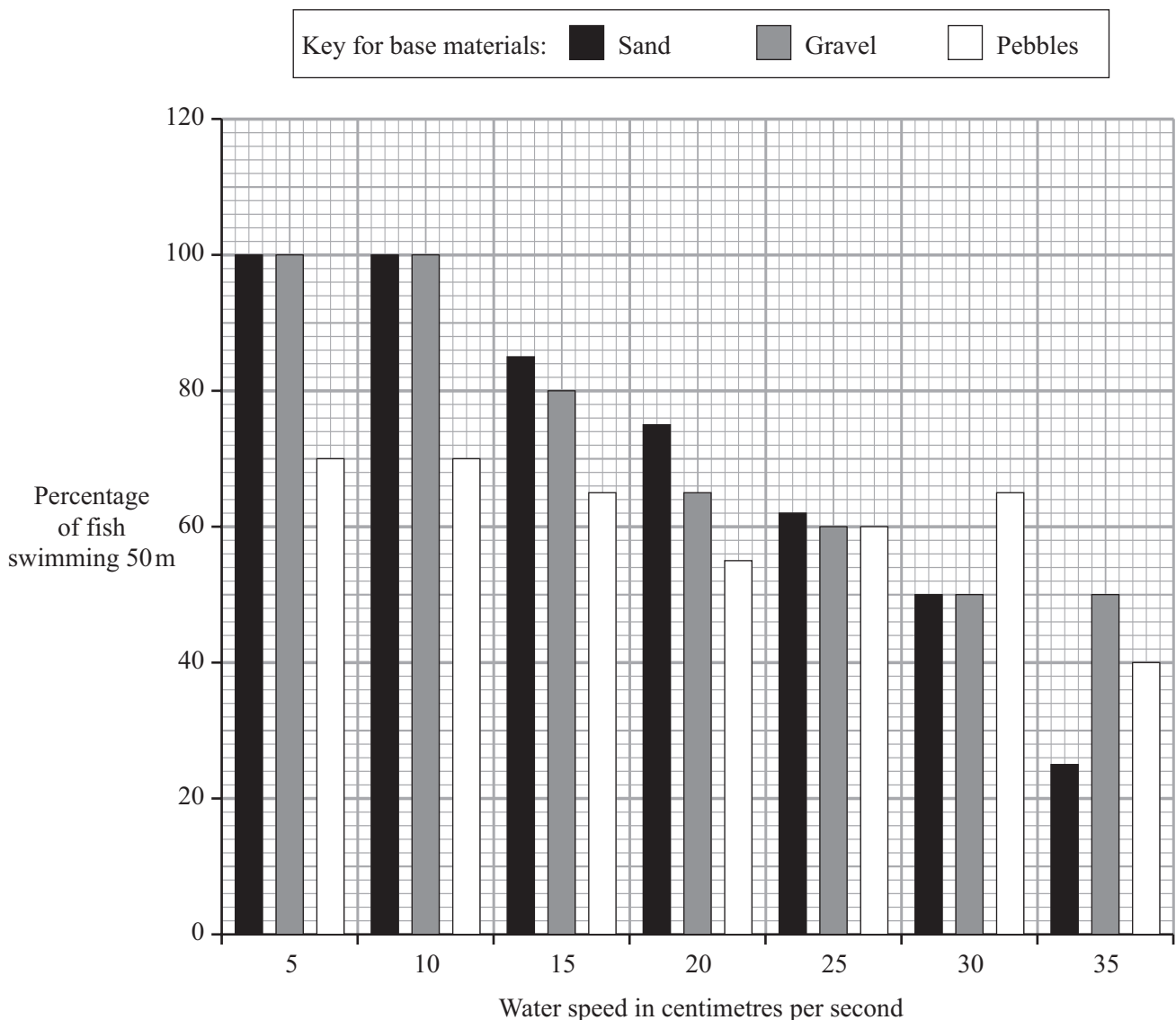
A series of investigations was carried out to determine the effect of water speed on the swimming abilities of a species of fish.

A long tank was constructed to simulate a stream.

A number of fish were placed at one end and a pump was used to move the water from the other end.



The water was pumped at different speeds and the percentage of fish able to swim 50m along the tank was recorded. This was carried out with three different types of base material: sand, gravel and pebbles. The investigation was repeated several times for each material and the results in the chart represent the average of the readings taken.



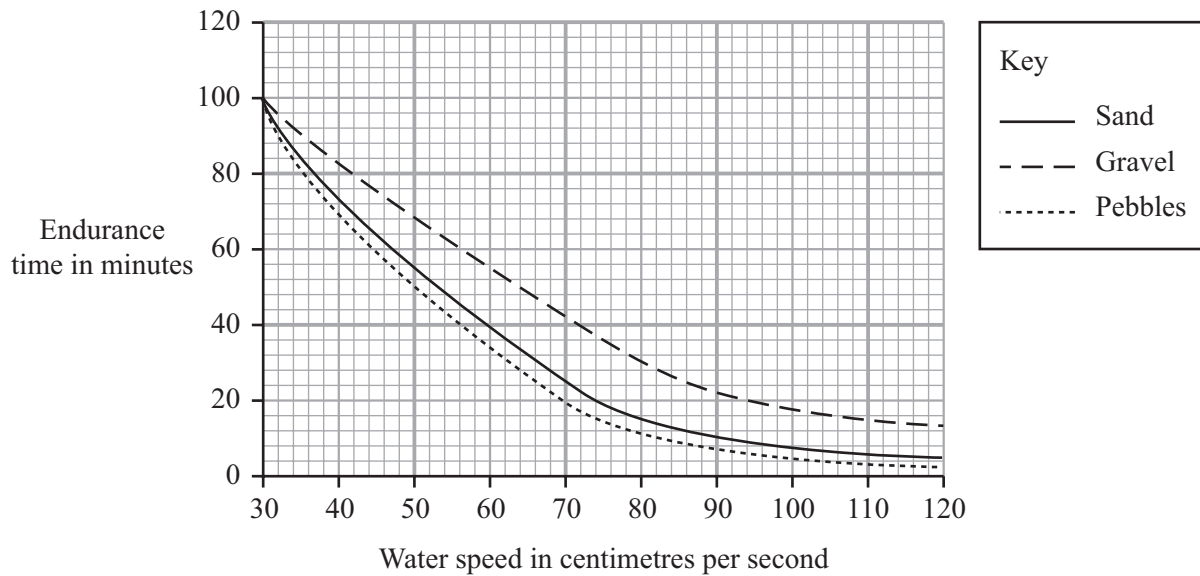
- 10.1** At what water speed did a change in the type of base material have the least effect on the percentage of fish swimming the 50 metre length?
- A 5 centimetres per second
 - B 20 centimetres per second
 - C 25 centimetres per second
 - D 30 centimetres per second
- 10.2** What was the change in the percentage of fish swimming the 50 metre length over pebbles when the water speed changed from 20 to 30 centimetres per second?
- A Minus 10
 - B No change
 - C Plus 5
 - D Plus 10
- 10.3** Which is the most likely reason for collecting these data?
- A To find out if all species of fish are affected by changes in environmental conditions in the same way
 - B To find out if changes in environmental conditions affect swimming in this species of fish
 - C To find out if some of the fish can swim faster than others
 - D To find the average number of fish swimming 50 m

QUESTION 10 CONTINUES ON THE NEXT PAGE

Turn over ►

10.4 A second investigation was carried out to find the endurance of the fish swimming against different water speeds. The endurance time is measured as the length of time all the fish are able to swim against the current of water.

The graph shows the results.



What does the graph show?

- A All the fish can swim faster than 30 centimetres per second over all base materials
- B Compared with swimming over gravel and pebbles, fish swimming over sand have a greater endurance time
- C For all base materials, the endurance time of the fish decreases as the water speed increases
- D The greatest difference in the endurance time of fish swimming over sand and gravel was at a water speed of 90 centimetres per second

END OF TEST