

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2006



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

346019

Tuesday 27 June 2006 Morning Session

For this paper you must have:

- a black ball-point pen
- an objective test answer sheet

You may use a calculator.

Time allowed: 30 minutes

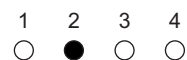
Instructions

- 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.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers

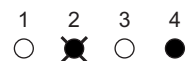
- Use a **black ball-point pen**.

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

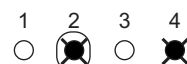


- Do **not** extend beyond the circles.

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



- 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:



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 14 of this booklet.

FOUNDATION TIER

SECTION A

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

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

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

Mark your choices on the answer sheet.

QUESTION ONE

The diagram shows the teeth in the lower jaw of a human.

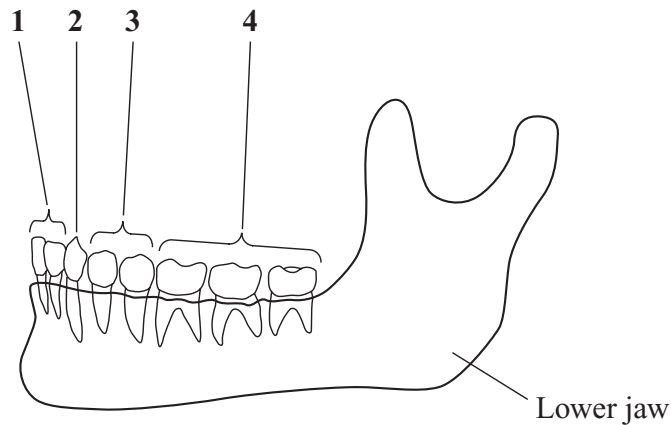
Match words from the list with the labels **1–4** on the diagram.

canine

incisor

molar

premolar



QUESTION TWO

Table 1 gives some information about joints in the human body.

Table 1

Position of joint	Type of joint	Degree of movement
Ankle	Rotational	65°
Elbow	Hinge	150°
Finger	Hinge	145°
Hip	Ball and socket	120°
Knee	Hinge	135°
Shoulder	Ball and socket	180°
Spine	Rotational	20°
Wrist	Ball and socket	180°

Match words from the list with the numbers **1–4** in **Table 2**.

ankle

ball and socket

finger

hinge

Table 2

	Type of joint or position of joint
1	the position of the joint with 145° of movement
2	the position of the rotational joint with the greatest degree of movement
3	the type of joint found at the knee
4	the type of joint with the greatest degree of movement

Turn over ►

QUESTION THREE

This question is about feeding in animals.

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

dogs

humans

mosquitoes

mussels

Animal	Feeding method
1	are adapted to eat a wide variety of foods
2	are filter feeders
3	feed only on liquid food
4	have teeth adapted to grip prey

QUESTION FOUR

Exercise is important for a healthy body.

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

decreases

fibres

increases

joints

Regular exercise improves the tone of the . . . **1** . . . in the muscles.

It also . . . **2** . . . the risk of muscles feeling stiff after exercise.

Regular exercise . . . **3** . . . blood flow to the muscles.

Exercise also ensures that the . . . **4** . . . work smoothly.

QUESTION FIVE

Mosquitoes feed on humans.

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

capillary

muscles

proboscis

saliva

Structure	Function
1	part of the human which contains the mosquito's food
2	prevents clotting
3	suck up the food
4	used to penetrate human skin

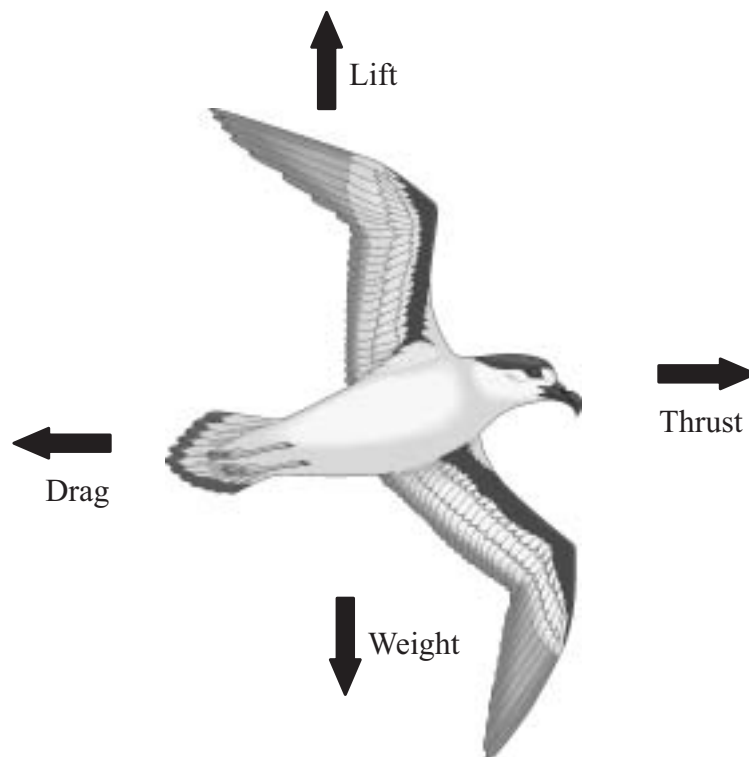
Turn over for the next question

Turn over ►

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 forces operating on a bird when it is flying.

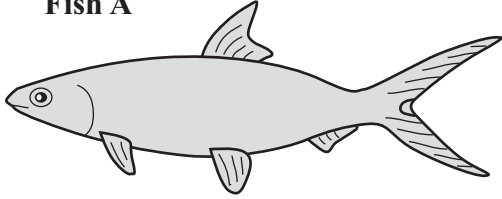
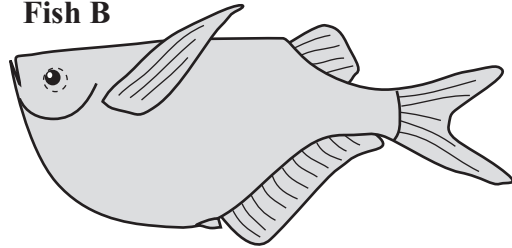
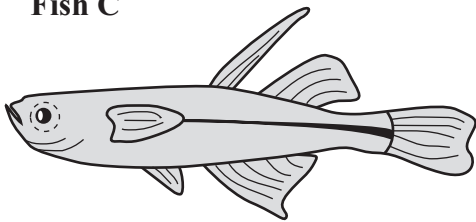
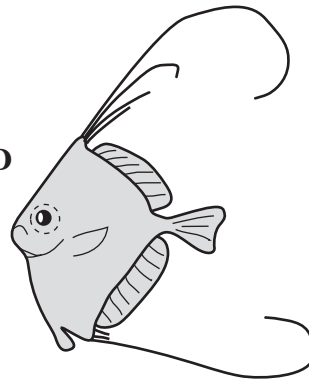
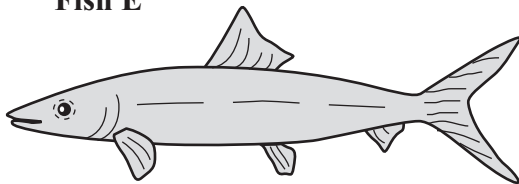
Which **two** adaptations of a bird enable it to overcome the forces of drag and weight?**a large body mass to provide the weight****a streamlined shape****long legs to provide the lift****long tail feathers to provide the thrust****wings with a large surface area to provide the lift**

QUESTION SEVEN

Fish are adapted to living in water in a number of ways.

Which **two** of the following fish have bodies which are **not** adapted for moving at high speed in water?

(The drawings are **not** to scale.)

Fish A**Fish B****Fish C****Fish D****Fish E****Turn over ►**

SECTION C**Questions EIGHT to TEN.**

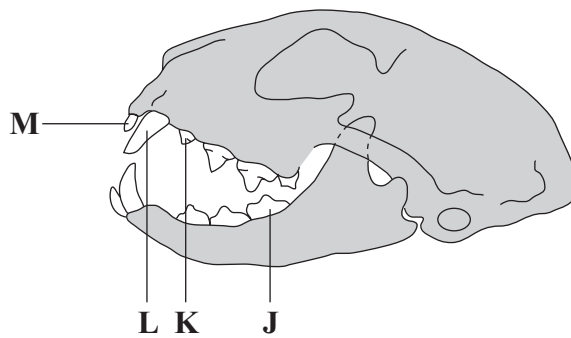
Each of these questions has four parts.

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

QUESTION EIGHT

Cats eat fish and meat.

The drawing shows a cat skull.

**8.1** Which tooth is small and best adapted for pulling fish apart?

- A J
- B K
- C L
- D M

8.2 Which is a carnassial tooth?

- A J
- B K
- C L
- D M

8.3 The jagged surfaces of tooth **J** are best adapted for . . .

- A** gripping prey.
- B** pulling flesh apart.
- C** shearing fish skin.
- D** tearing fish.

8.4 The cat has a carnivorous diet.

Its lower jaw is likely to move . . .

- A** both up and down and from side to side.
- B** from side to side only.
- C** in a circular path.
- D** up and down only.

Turn over for the next question

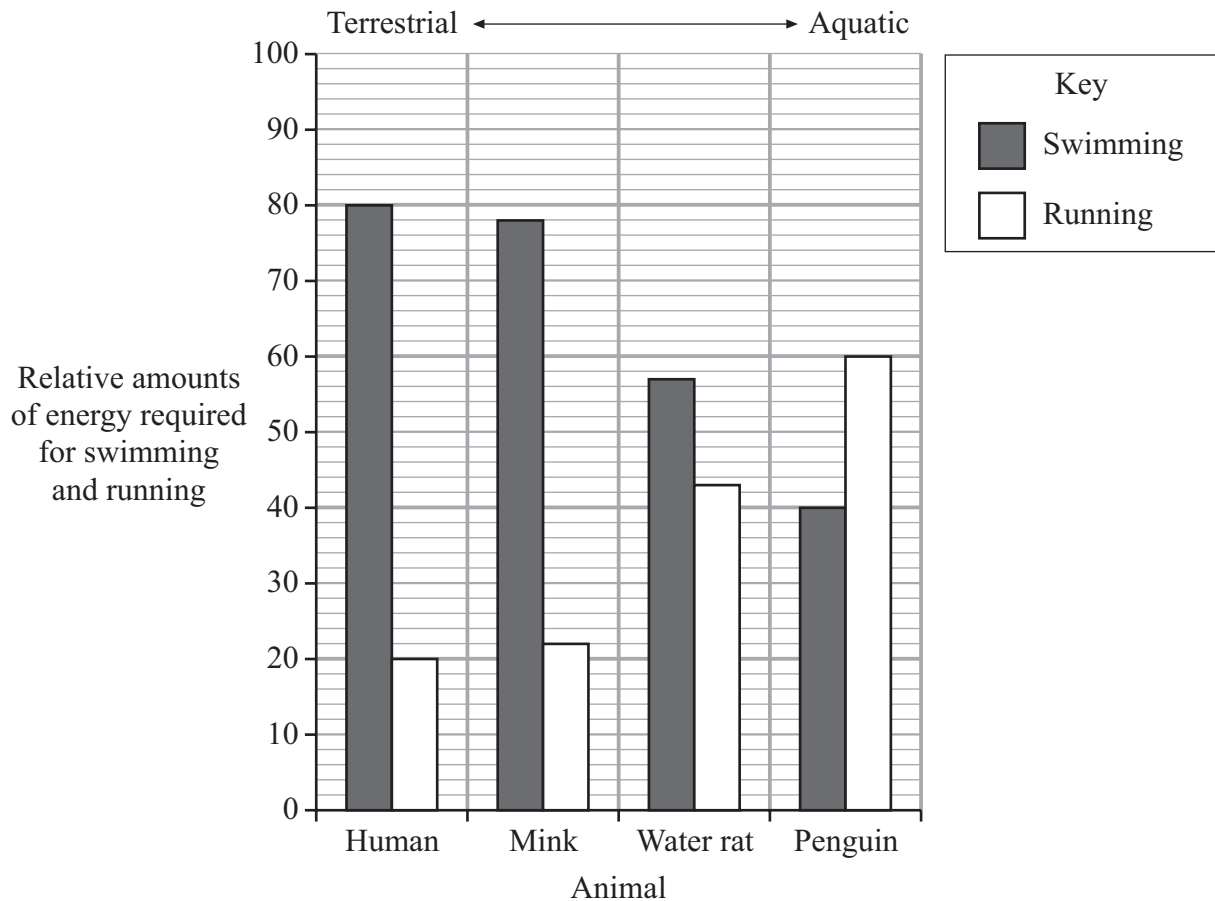
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QUESTION NINE

Some animals live on land (are terrestrial) but are able to move in water. Other animals live in water (are aquatic) but are able to move on land.

Moving in water and on land requires the use of energy.

The chart shows the relative amounts of energy required by terrestrial and aquatic animals when running and swimming.



9.1 Which animals use more than three times the energy when swimming compared with running?

- A Humans and mink
- B Humans and penguins
- C Mink and penguins
- D Mink and water rats

9.2 Which two animals are most likely to be well adapted to movement in water?

- A Humans and penguins
- B Mink and penguins
- C Mink and water rats
- D Water rats and penguins

9.3 How much more energy do penguins require for running compared with swimming?

- A One third more
- B One and a half times as much
- C Twice as much
- D Sixty times more

9.4 The white rat is a more terrestrial animal than the water rat.

What is the most likely relative amount of energy required for swimming by the white rat?

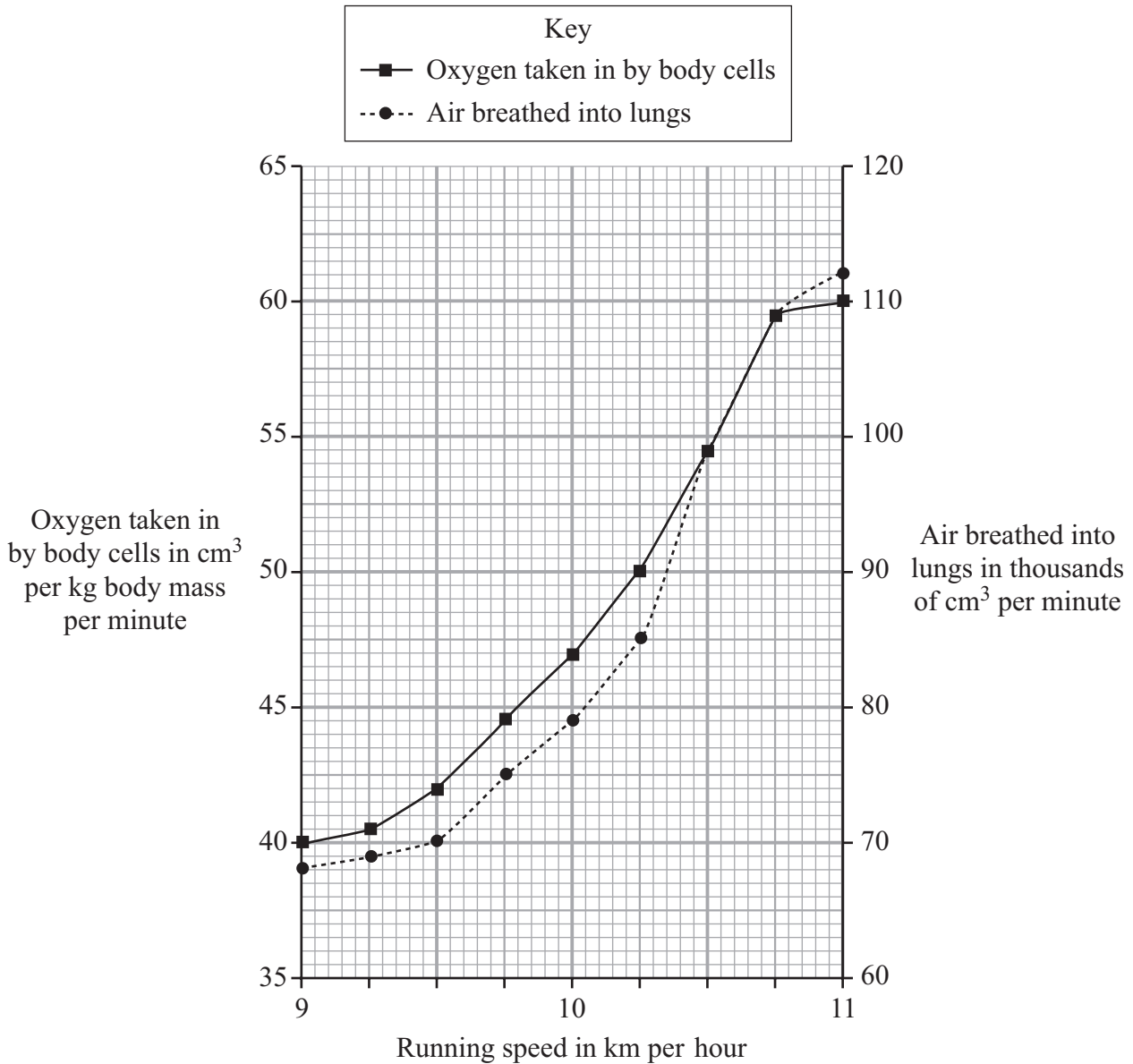
- A Less than 40
- B Less than 50 but more than 40
- C More than 57
- D The same as the water rat

Turn over for the next question

Turn over ►

QUESTION TEN

The graph shows how the speed of a runner affects his oxygen uptake and the amount of air breathed into his lungs.



10.1 How much air is breathed into the lungs of the runner when he runs at 9 km per hour for 2 minutes?

- A 39 000 cm³
- B 40 000 cm³
- C 136 000 cm³
- D 140 000 cm³

10.2 At what rate is oxygen taken in by the body cells of the runner when his speed is 9.5 km per hour?

- A 40 cm³ per kg body mass per minute
- B 42 cm³ per kg body mass per minute
- C 54 cm³ per kg body mass per minute
- D 70 cm³ per kg body mass per minute

10.3 What happens to the amount of oxygen taken in by the body cells as the runner increases his speed from 9 to 10 km per hour?

- A It increases by a quarter.
- B It increases by one fifth.
- C It increases by 7 cm³ per kg body mass per minute.
- D It increases by 11 cm³ per kg body mass per minute.

10.4 Extra oxygen is taken in when the runner is running faster.

What is this extra oxygen used for?

- A To give out more carbon dioxide
- B To keep the muscles toned
- C To provide the muscles with more glucose
- D To release more energy

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 words in the list with the numbers.

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

Mark your choices on the answer sheet.

QUESTION ONE

Mosquitoes feed on humans.

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

capillary

muscles

proboscis

saliva

Structure	Function
1	part of the human which contains the mosquito's food
2	prevents clotting
3	suck up the food
4	used to penetrate human skin

QUESTION TWO

The bodies of birds are adapted to flight in a number of ways.

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

bones

flight feathers

sternum

wing

Structure	Feature
1	aerofoil shape
2	honey-combed structure to reduce mass
3	interlocking barbs
4	large surface area for muscle attachment

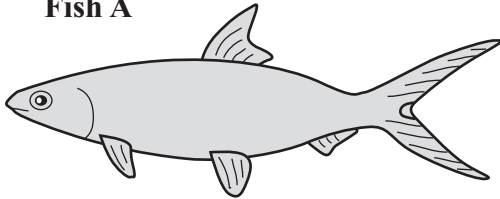
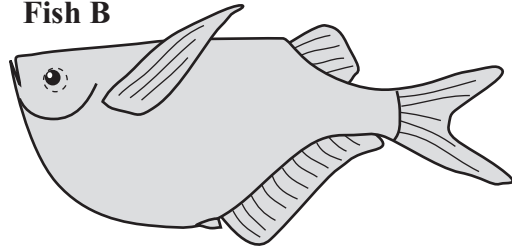
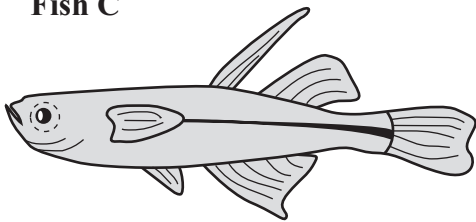
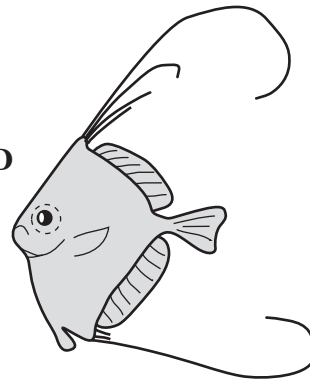
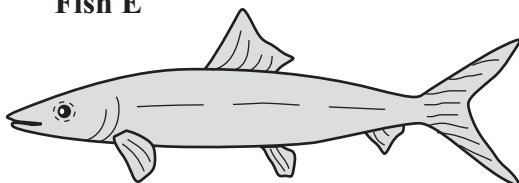
Turn over for the next question

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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

Fish are adapted to living in water in a number of ways.

Which **two** of the following fish have bodies which are **not** adapted for moving at high speed in water?(The drawings are **not** to scale.)**Fish A****Fish B****Fish C****Fish D****Fish E**

QUESTION FOUR

Joints contain a number of structures which have different properties.

Which **two** of the following are properties which allow joints to move freely and easily?

an oily fluid which acts as a lubricant

a rigid substance containing calcium phosphate

a smooth substance which can be compressed slightly and is able to absorb shock

a structure which has tensile strength but little elasticity

a structure which has tensile strength and some elasticity

Turn over for the next question

Turn over ►

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

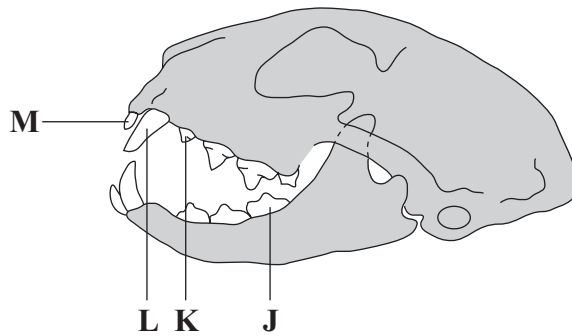
Each of these questions has four parts.

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

QUESTION FIVE

Cats eat fish and meat.

The drawing shows a cat skull.

**5.1** Which tooth is small and best adapted for pulling fish apart?

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5.2 Which is a carnassial tooth?

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5.3 The jagged surfaces of tooth **J** are best adapted for . . .

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5.4 The cat has a carnivorous diet.

Its lower jaw is likely to move . . .

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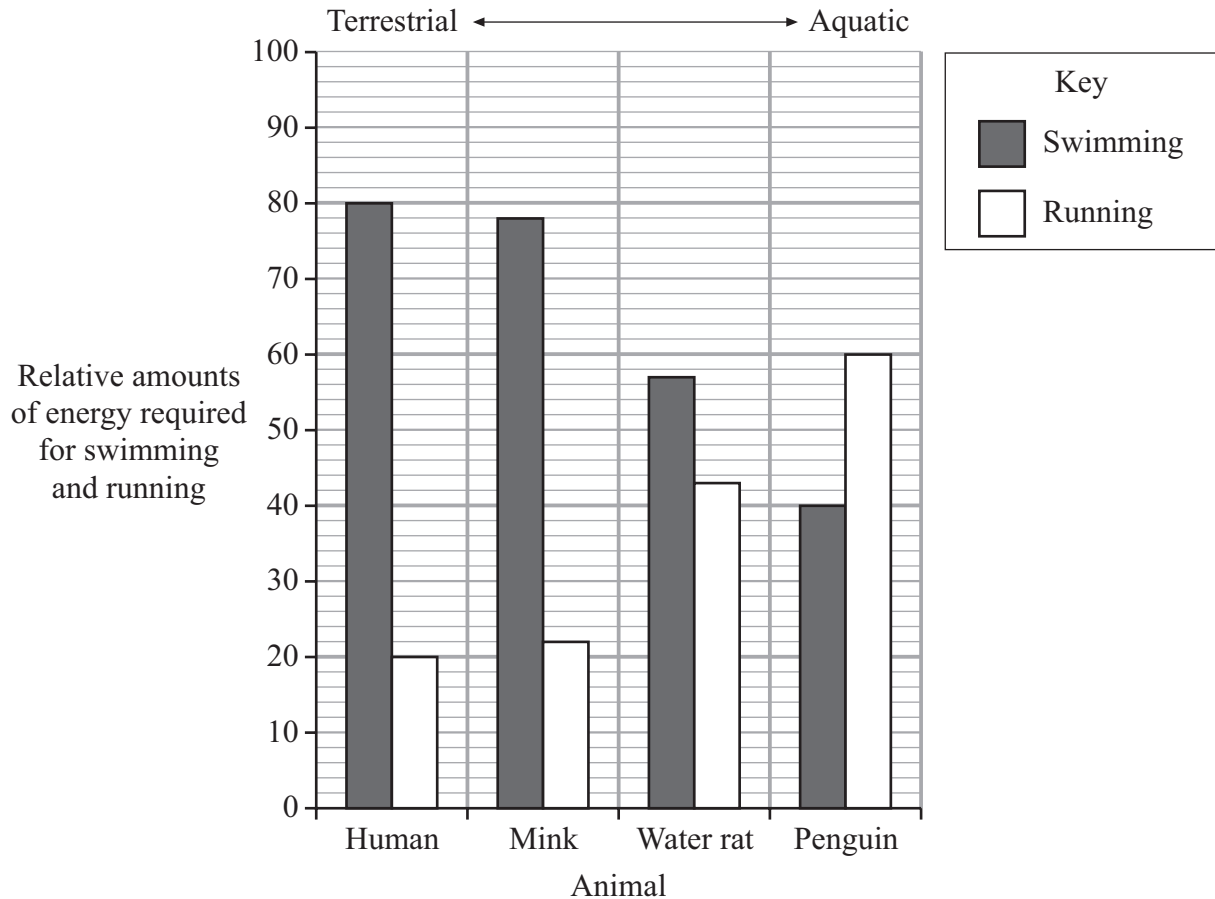
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QUESTION SIX

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6.1 Which animals use more than three times the energy when swimming compared with running?

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- C Mink and penguins
- D Mink and water rats

- 6.2** Which two animals are most likely to be well adapted to movement in water?
- A** Humans and penguins
 - B** Mink and penguins
 - C** Mink and water rats
 - D** Water rats and penguins
- 6.3** How much more energy do penguins require for running compared with swimming?
- A** One third more
 - B** One and a half times as much
 - C** Twice as much
 - D** Sixty times more
- 6.4** The white rat is a more terrestrial animal than the water rat.

What is the most likely relative amount of energy required for swimming by the white rat?

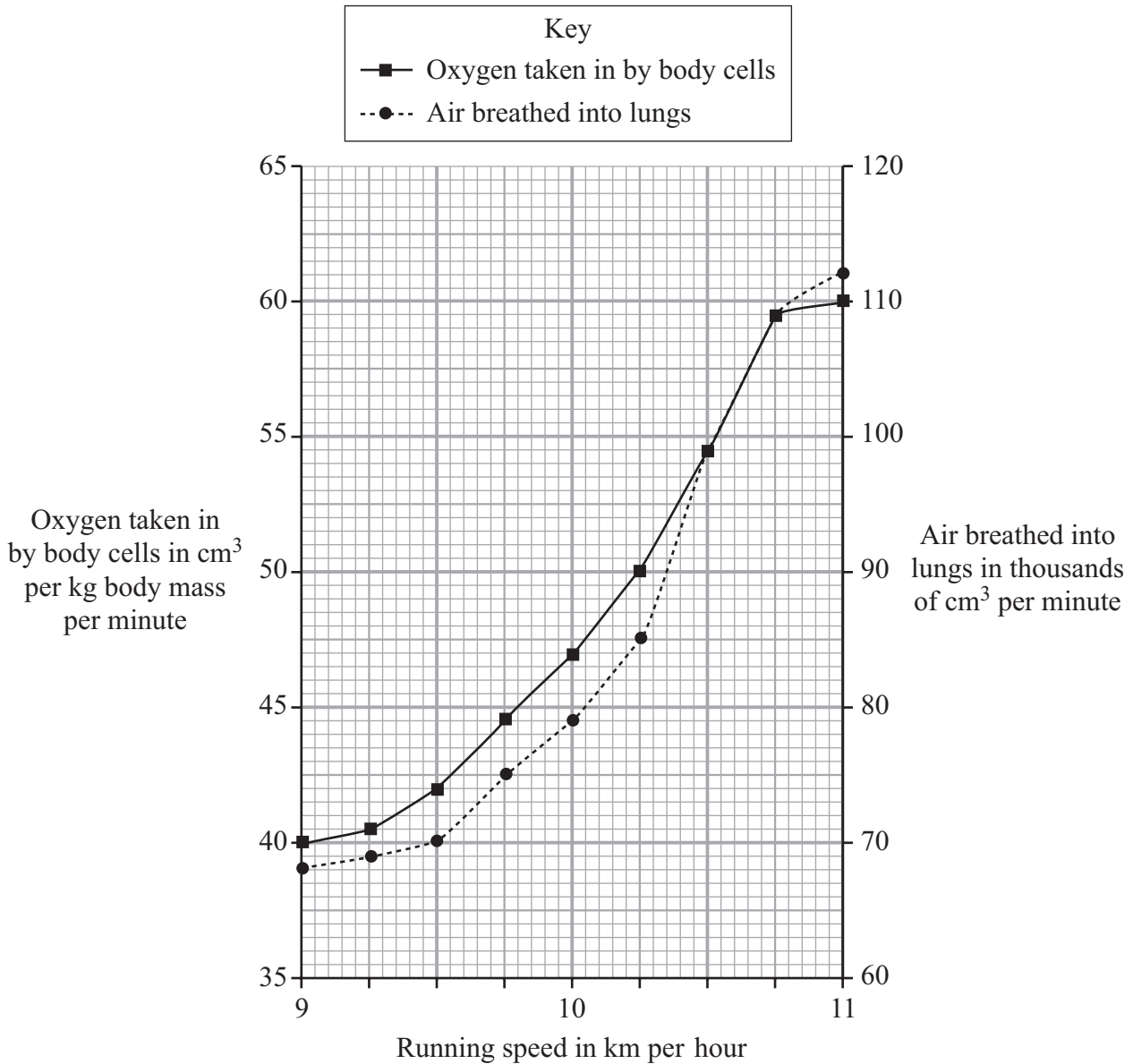
- A** Less than 40
- B** Less than 50 but more than 40
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Turn over for the next question

Turn over ►

QUESTION SEVEN

The graph shows how the speed of a runner affects his oxygen uptake and the amount of air breathed into his lungs.



7.1 How much air is breathed into the lungs of the runner when he runs at 9 km per hour for 2 minutes?

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- B 40 000 cm³
- C 136 000 cm³
- D 140 000 cm³

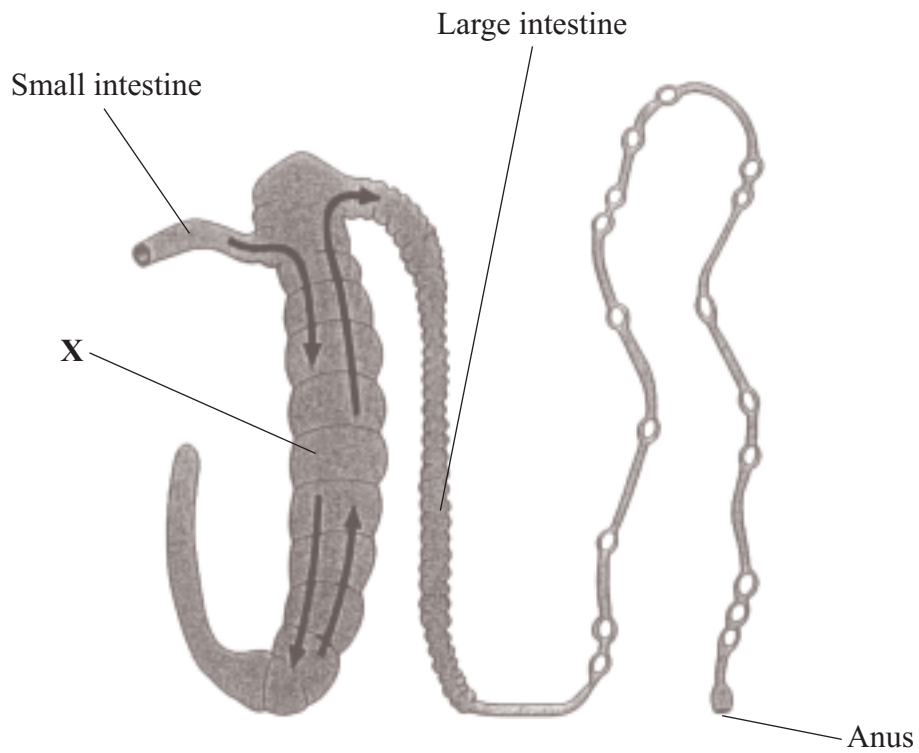
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- 7.2** At what rate is oxygen taken in by the body cells of the runner when his speed is 9.5 km per hour?
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 - B** 42 cm³ per kg body mass per minute
 - C** 54 cm³ per kg body mass per minute
 - D** 70 cm³ per kg body mass per minute
- 7.3** What happens to the amount of oxygen taken in by the body cells as the runner increases his speed from 9 to 10 km per hour?
- A** It increases by a quarter.
 - B** It increases by one fifth.
 - C** It increases by 7 cm³ per kg body mass per minute.
 - D** It increases by 11 cm³ per kg body mass per minute.
- 7.4** Extra oxygen is taken in when the runner is running faster.
- What is this extra oxygen used for?
- A** To give out more carbon dioxide
 - B** To keep the muscles toned
 - C** To provide the muscles with more glucose
 - D** To release more energy

Turn over for the next question

Turn over ►

QUESTION EIGHT

The diagram shows part of the digestive system of a rabbit.



8.1 The rabbit produces enzymes in the small intestine.

Rabbit enzymes are unable to digest . . .

- A cellulose.
- B fat.
- C protein.
- D starch.

8.2 The part of the digestive system labelled X is the . . .

- A caecum.
- B liver.
- C small intestine.
- D stomach.

- 8.3** By the time food reaches the cellulose-digesting bacteria in **X**, it has gone past the point where the sugars produced by digestion can be absorbed.

To obtain enough sugars, rabbits . . .

- A** eat much larger quantities of food.
 - B** eat their own faeces.
 - C** pass the food back to the mouth from the stomach.
 - D** pass the food back up to the small intestine.
- 8.4** The bacteria living in the rabbit's digestive system depend on the rabbit as much as the rabbit depends on them.

This is an example of . . .

- A** filter feeding.
- B** mutualism.
- C** parasitism.
- D** ruminating.

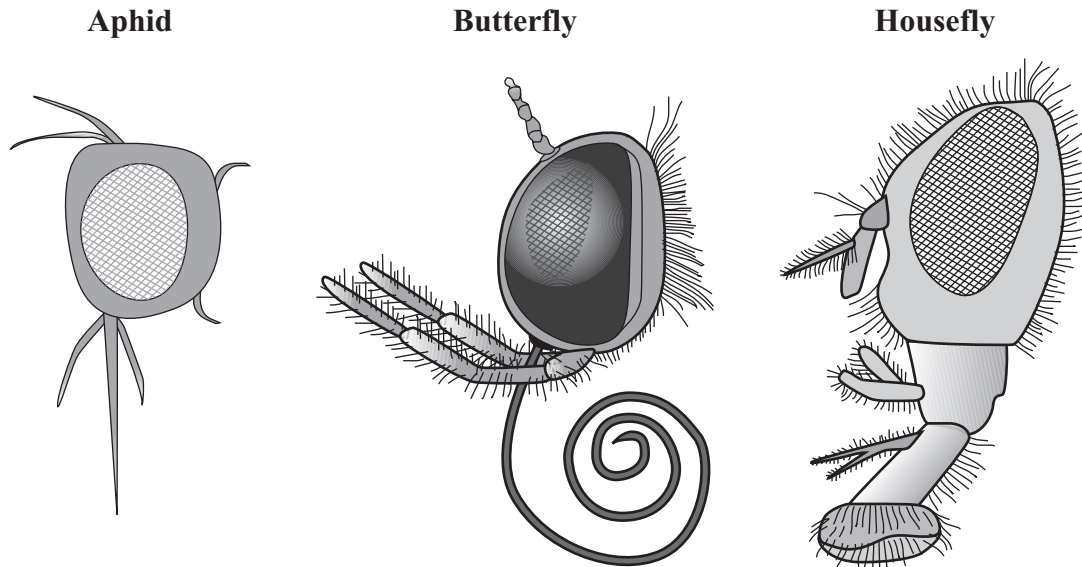
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QUESTION NINE

The drawings show the feeding parts of an aphid, a butterfly and a housefly. All of these insects feed by sucking liquids.

(The drawings are **not** to scale.)



9.1 Which insects have mouth parts adapted for reaching deeply into flowers to obtain food?

- A Both aphids and butterflies
- B Both aphids and houseflies
- C Butterflies only
- D Houseflies only

9.2 Which insects have mouth parts adapted for puncturing plant stems to suck out food?

- A Aphids only
- B Both aphids and butterflies
- C Both aphids and houseflies
- D Butterflies only

9.3 Which row of the table, **A**, **B**, **C** or **D**, shows the insects most likely to feed in the places shown?

	In flowers	Under leaves	On stem of a plant	On manure at base of stem
A	Aphid	Aphid	Butterfly	Housefly
B	Butterfly	Aphid	Aphid	Housefly
C	Butterfly	Butterfly	Aphid	Housefly
D	Butterfly	Housefly	Butterfly	Aphid

9.4 When houseflies feed, they change solid food into liquid food by secreting saliva onto it. This digests the food. The digested liquid food is then sucked into the housefly's body.

How is the housefly adapted to feed in this way?

- A** It has a proboscis with a large surface area.
- B** It has a sharp proboscis.
- C** It has large eyes.
- D** It produces saliva which prevents blood from clotting.

Turn over for the next question

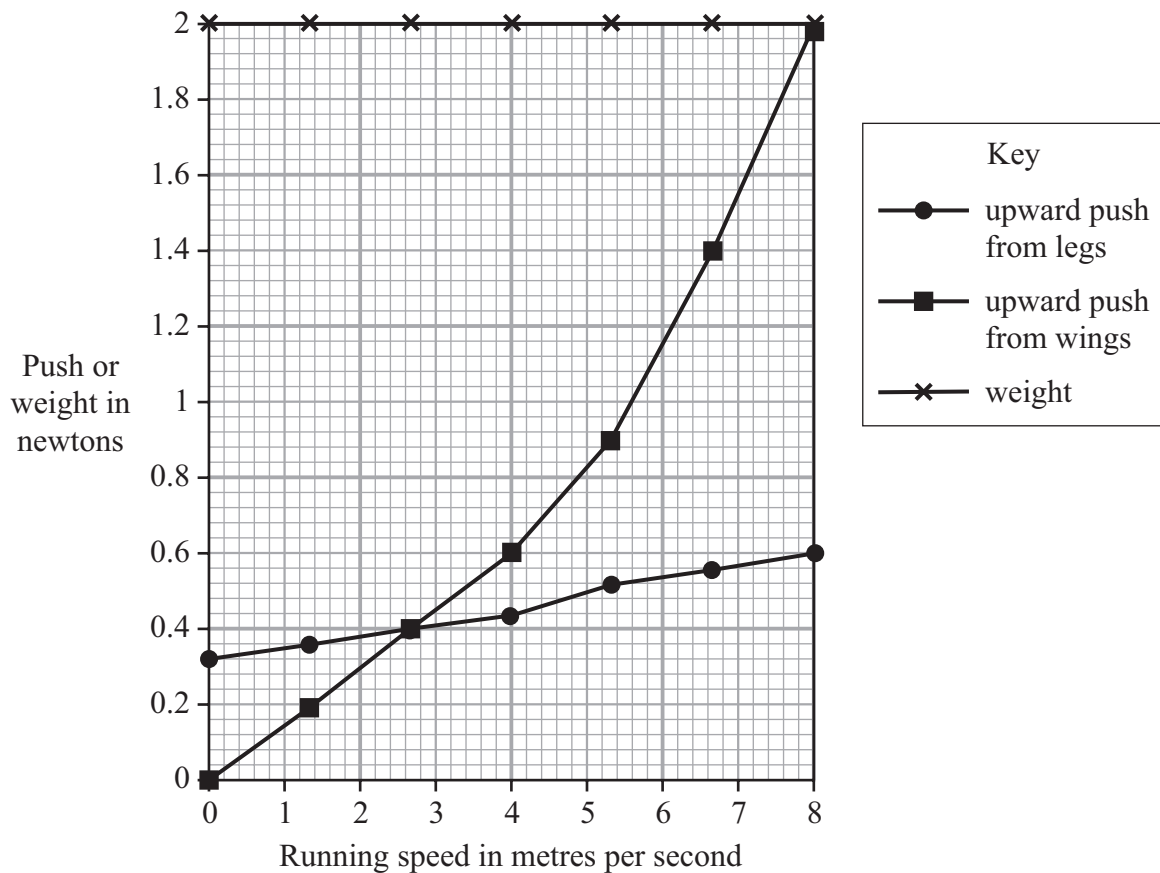
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QUESTION TEN

Archaeopteryx is an extinct vertebrate that scientists think could fly. The scientists are not sure whether it could only glide from trees, or whether it could take off by running whilst flapping its wings.

Archaeopteryx weighed about 2 newtons.

The graph shows estimates of how the running speed might affect the upward push from its wings and the upward push from its legs.



10.1 As the running speed increases . . .

- A the increase in the push from the wings is greater than the increase in the push from the legs.
- B the increase in the weight is greater than the increase in the push from the legs.
- C the push from the legs increases in inverse proportion to the speed.
- D the push from the wings increases in direct proportion to the speed.

10.2 At what speed would *Archaeopteryx* leave the ground?

- A 2.6 metres per second
- B 4.0 metres per second
- C 6.8 metres per second
- D 8.0 metres per second

10.3 The shape of a wing generates lift by . . .

- A increasing the air pressure above the wing.
- B decreasing the air pressure above the wing.
- C increasing the air pressure below the wing.
- D decreasing the air pressure below the wing.

10.4 Scientists think that *Archaeopteryx* had much smaller wing muscles in relation to its size than a modern bird.

Which part of a fossil *Archaeopteryx* would give the best evidence for this?

- A Barbs
- B Keel
- C Primary feathers
- D Secondary feathers

END OF TEST

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