

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
March 2007



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

346019

Wednesday 7 March 2007 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

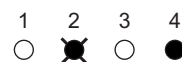
- Use a **black ball-point pen**.

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

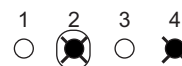


- Do **not** extend beyond the circles.

- 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 from the list with the numbers.

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

Mark your choices on the answer sheet.

QUESTION ONE

The drawings show the skulls and teeth of four animals.

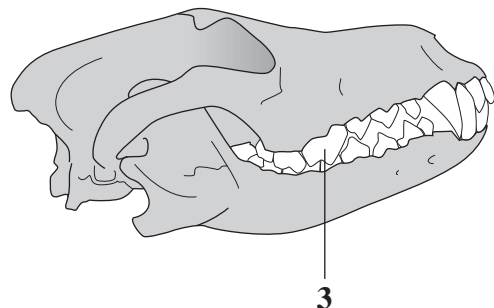
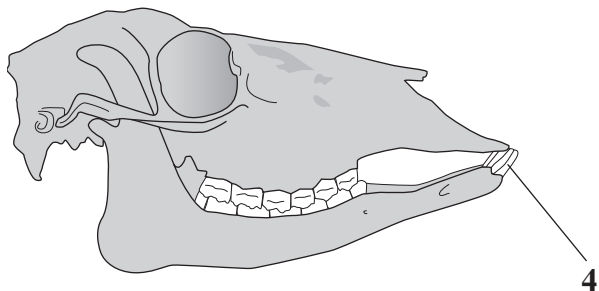
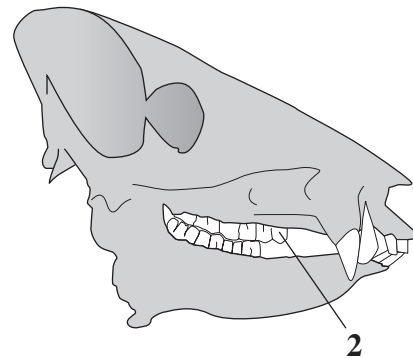
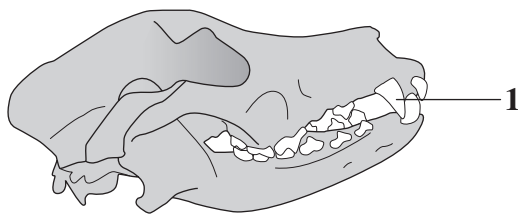
Match words from the list with the labels **1–4** on the drawings.

canine tooth

carnassial tooth

incisor tooth

premolar tooth



QUESTION TWO

The diagram shows a section of a human joint.

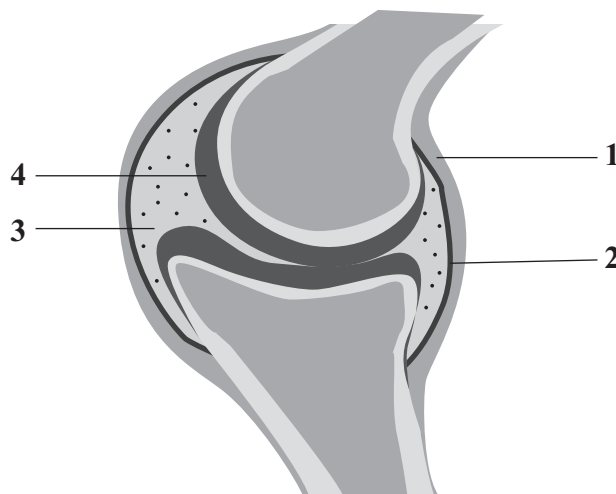
Match words from the list with the labels 1–4 on the diagram.

cartilage

ligament

membrane

synovial fluid

**QUESTION THREE**

Dogs feed using their jaws and teeth which are adapted for a carnivorous diet.

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

canine teeth

carnassial teeth

incisor teeth

muscle

Structure	Function
1	shortens to close up the jaw
2	used to crush bones
3	used to grip prey
4	used to pull meat apart

Turn over ►

QUESTION FOUR

Mosquitoes feed on human blood.

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

capillary

proboscis

saliva

throat muscles

Mosquitoes have a needle-like tube called the ... **1**

The tube is inserted into a ... **2**

At the same time a mosquito secretes ... **3** ... into the blood.

Blood is then sucked up the tube by the action of the ... **4**

QUESTION FIVE

Birds are adapted for flight.

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

bones

flight feathers

lift

resistance

Wings push downwards on the air and give the bird ... **1**

The large surface area needed for this is provided by the ... **2**

The mass of the bird is reduced as it has honey-combed ... **3**

The streamlined shape of the bird reduces air ... **4**

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

Fish are adapted to move in water.

Which **two** of the following help fish to move through water?**cilia that produce a current of water****gills****hollow bones****streamlined body shape****zig-zag arrangement of muscles in the body****Turn over for the next question****Turn over ►**

QUESTION SEVEN

The diagram shows a mussel.

Which **two** things help the mussel to feed?

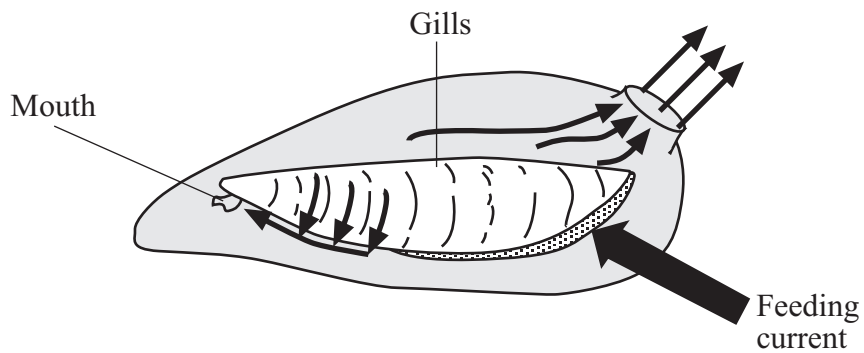
cilia that move food to the mouth

gills that beat and move the mussel

gills which filter plankton from the water

mouthparts that can suck blood

teeth for crushing small creatures



Turn over for the next question

Turn over ►

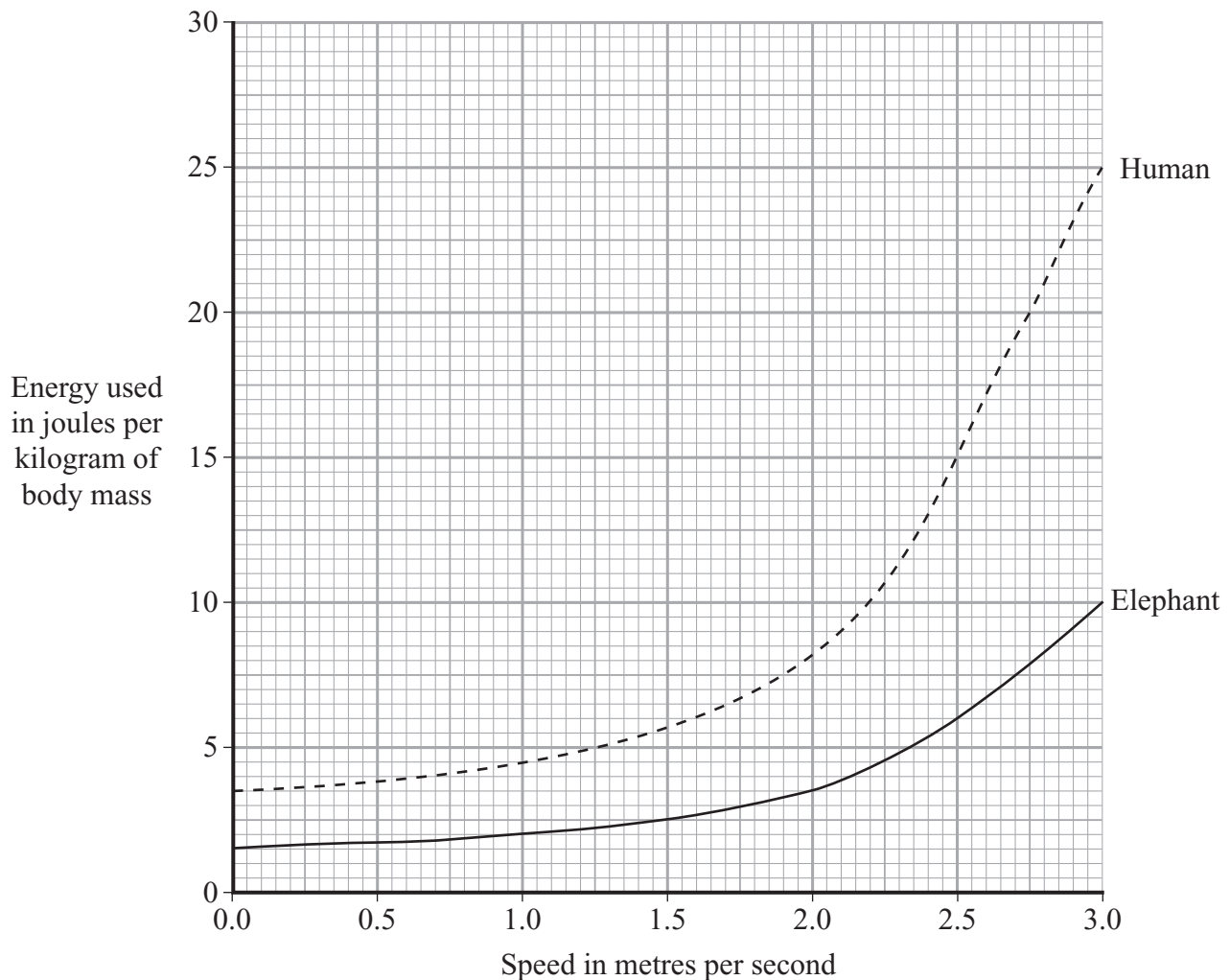
SECTION CQuestions **EIGHT** to **TEN**.

Each of these questions has four parts.

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

QUESTION EIGHT

The graph shows the amount of energy (measured in joules per kilogram of body mass) used by an elephant and a human when walking at different speeds.



-
- 8.1** When an elephant increases its speed from 1.0 metre per second to 2.5 metres per second, the energy used increases . . .
- A** 2 times.
 - B** 3 times.
 - C** 5 times.
 - D** 8 times.
- 8.2** The difference between the energy used by humans and elephants when walking at 2.5 metres per second is . . .
- A** 8.0 joules per kilogram of body mass.
 - B** 8.5 joules per kilogram of body mass.
 - C** 9.0 joules per kilogram of body mass.
 - D** 9.5 joules per kilogram of body mass.
- 8.3** The energy used by elephants and humans is released by . . .
- A** feeding.
 - B** respiration.
 - C** the heart pumping.
 - D** walking.
- 8.4** When the speed of walking increases, the heart pumps faster.
- Which of the following happens as a result of this?
- A** Air enters the body more quickly.
 - B** Glucose and oxygen reach the muscles at a faster rate.
 - C** The lungs take in oxygen more quickly.
 - D** The muscles receive more carbon dioxide.

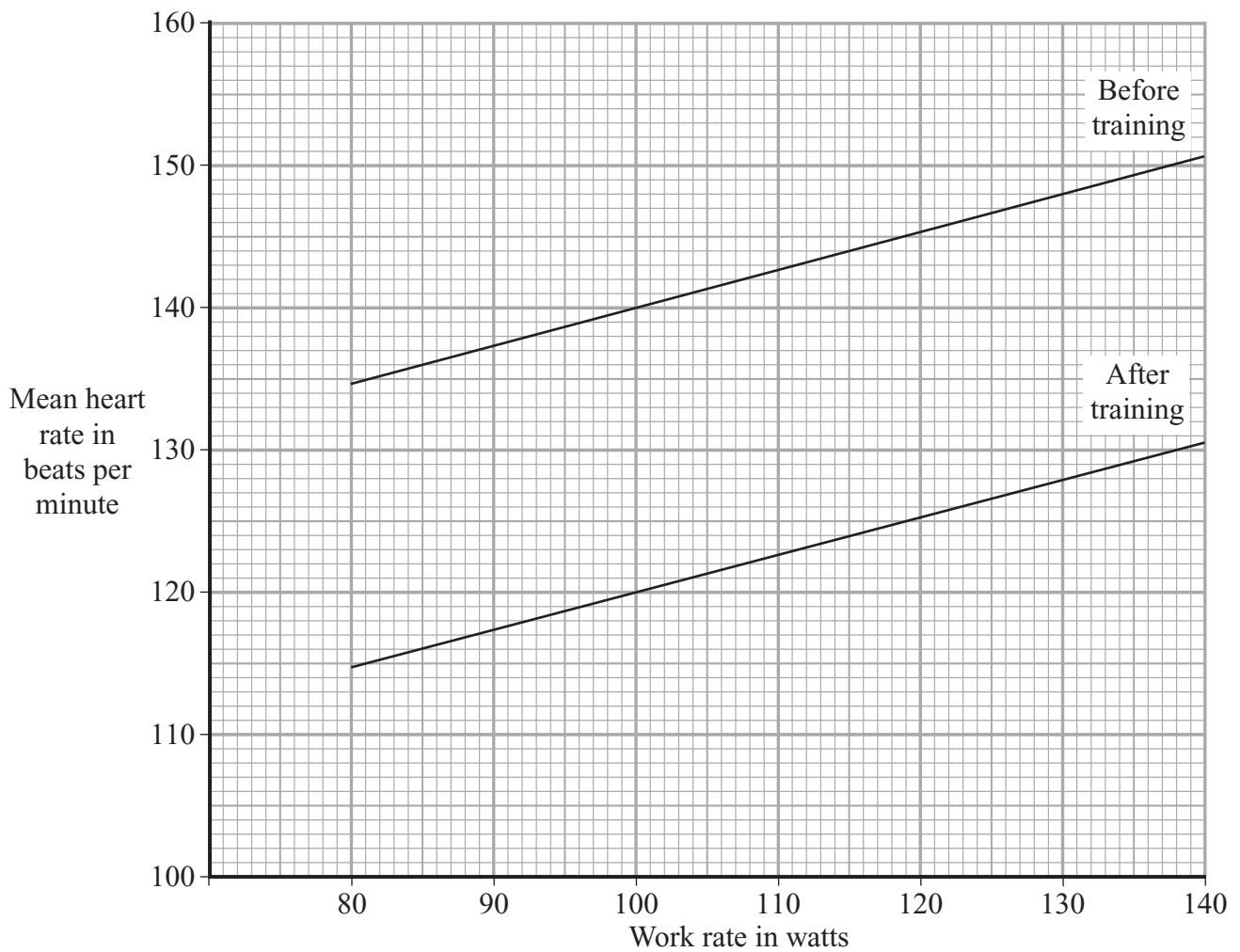
QUESTION NINE

Scientists investigated the effect of work rate and training on the heart rates of a group of students.

The heart rates of the students were measured as they exercised on gym cycling machines.

After the training period, the students' heart rates were measured again as they exercised on the cycling machines.

The results are shown on the graph.



9.1 When the students exercised at a rate of 100 watts, their mean heart rate after training . . .

- A decreased by 20 beats per minute.
- B decreased by 120 beats per minute.
- C decreased by 137 beats per minute.
- D decreased by 140 beats per minute.

9.2 The students had a lower heart rate after training because regular exercise . . .

- A improves blood supply to the heart and muscles.
- B keeps joints working smoothly.
- C keeps muscles well toned.
- D makes ligaments more flexible.

9.3 The heart rate of one of the students during exercise is 120 beats per minute.
The volume of blood pumped from the heart during each beat is 80 cm^3 .

What is the total volume of blood pumped from the heart during each minute?

- A 80 cm^3
- B 800 cm^3
- C 960 cm^3
- D 9600 cm^3

9.4 One student sprained her ankle during the training period.

A sprain occurs when . . .

- A a bone is forced out of a joint.
- B cartilage is damaged.
- C ligaments are torn.
- D muscle fibres become tense.

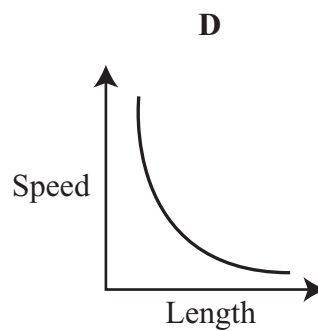
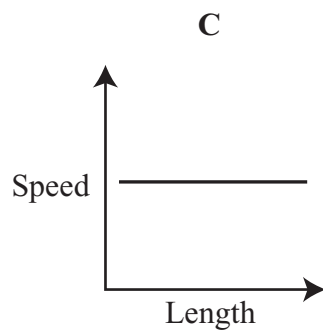
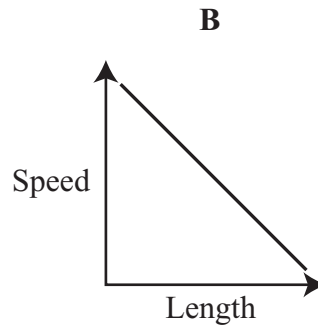
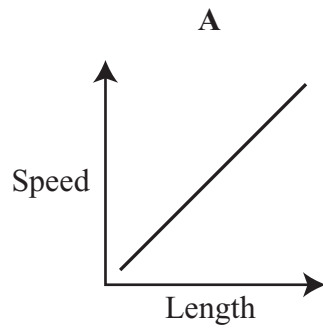
Turn over ►

QUESTION TEN

The table shows data about the length and swimming speed of a number of fish.

	Type of fish						
	Goldfish	Dace	Herring	Pike	Red Snapper	Tuna	Tailor fish
Length in m	0.10	0.16	0.40	0.50	0.70	1.00	1.20
Speed in m per s	1.10	1.20	1.58	1.65	2.24	2.85	3.22

10.1 Which graph, **A**, **B**, **C** or **D**, represents the data?



10.2 What is the pattern linking the length of a fish and its swimming speed?

- A The length does not affect the speed.
- B The longer the fish the faster it swims.
- C The longer the fish the slower it swims.
- D The shorter the fish the faster it swims.

10.3 Pacific Halibut are 0.9 metres long.

Pacific Halibut would be expected to have a swimming speed of . . .

- A less than 1.0 metres per second.
- B between 1.0 and 2.0 metres per second.
- C between 2.0 and 3.0 metres per second.
- D more than 3.0 metres per second.

10.4 The force needed for swimming is provided by the . . .

- A action of the paired fins and the small body mass.
- B action of the paired fins and the tail with a large surface area.
- C tail with a large surface area and the small body mass.
- D wave-like movement of the body and the tail with a large surface area.

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 from the list with the numbers.

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

Mark your choices on the answer sheet.

QUESTION ONE

Birds are adapted for flight.

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

bones

flight feathers

lift

resistance

Wings push downwards on the air and give the bird . . . **1**

The large surface area needed for this is provided by the . . . **2**

The mass of the bird is reduced as it has honey-combed . . . **3**

The streamlined shape of the bird reduces air . . . **4**

QUESTION TWO

A joint contains several parts which have particular characteristics.

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

cartilage

ligament

synovial membrane

tendon

Part	Characteristic
1	can be slightly compressed to absorb shock
2	has tensile strength but little elasticity
3	has tensile strength and some elasticity
4	secretes an oily fluid

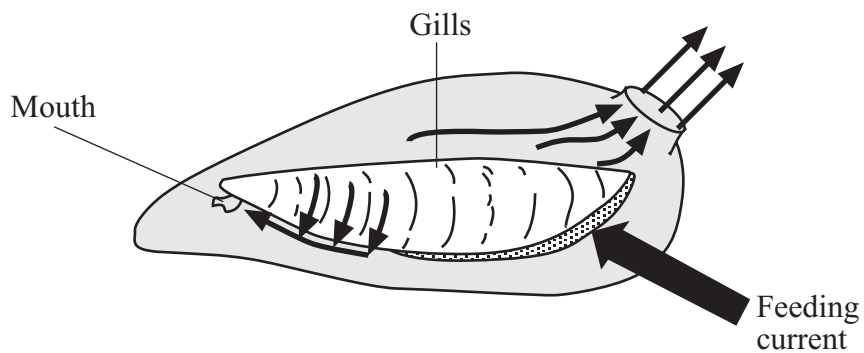
Turn over for the next question

Turn over ►

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 diagram shows a mussel.

Which **two** things help the mussel to feed?**cilia that move food to the mouth****gills that beat and move the mussel****gills which filter plankton from the water****mouthparts that can suck blood****teeth for crushing small creatures**

QUESTION FOUR

Which two features directly provide lift for a bird during flight?

a large sternum and keel

hollow shafts in the feathers

interlocking barbs on the flight feathers

the aerofoil shape of the wings

the movement of the wings

Turn over for the next question

Turn over ►

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

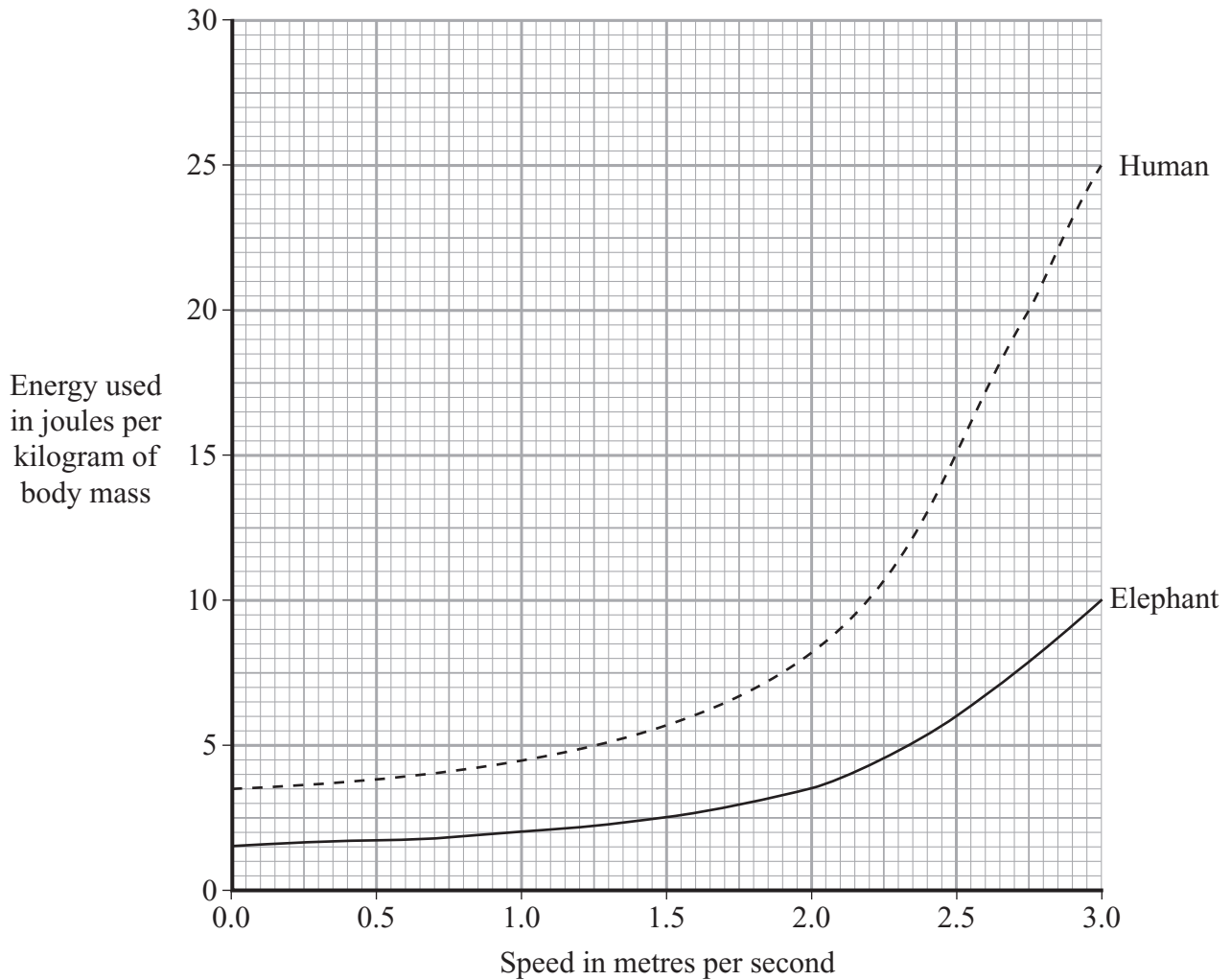
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QUESTION FIVE

The graph shows the amount of energy (measured in joules per kilogram of body mass) used by an elephant and a human when walking at different speeds.



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- 5.1** When an elephant increases its speed from 1.0 metre per second to 2.5 metres per second, the energy used increases . . .
- A** 2 times.
 - B** 3 times.
 - C** 5 times.
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- 5.2** The difference between the energy used by humans and elephants when walking at 2.5 metres per second is . . .
- A** 8.0 joules per kilogram of body mass.
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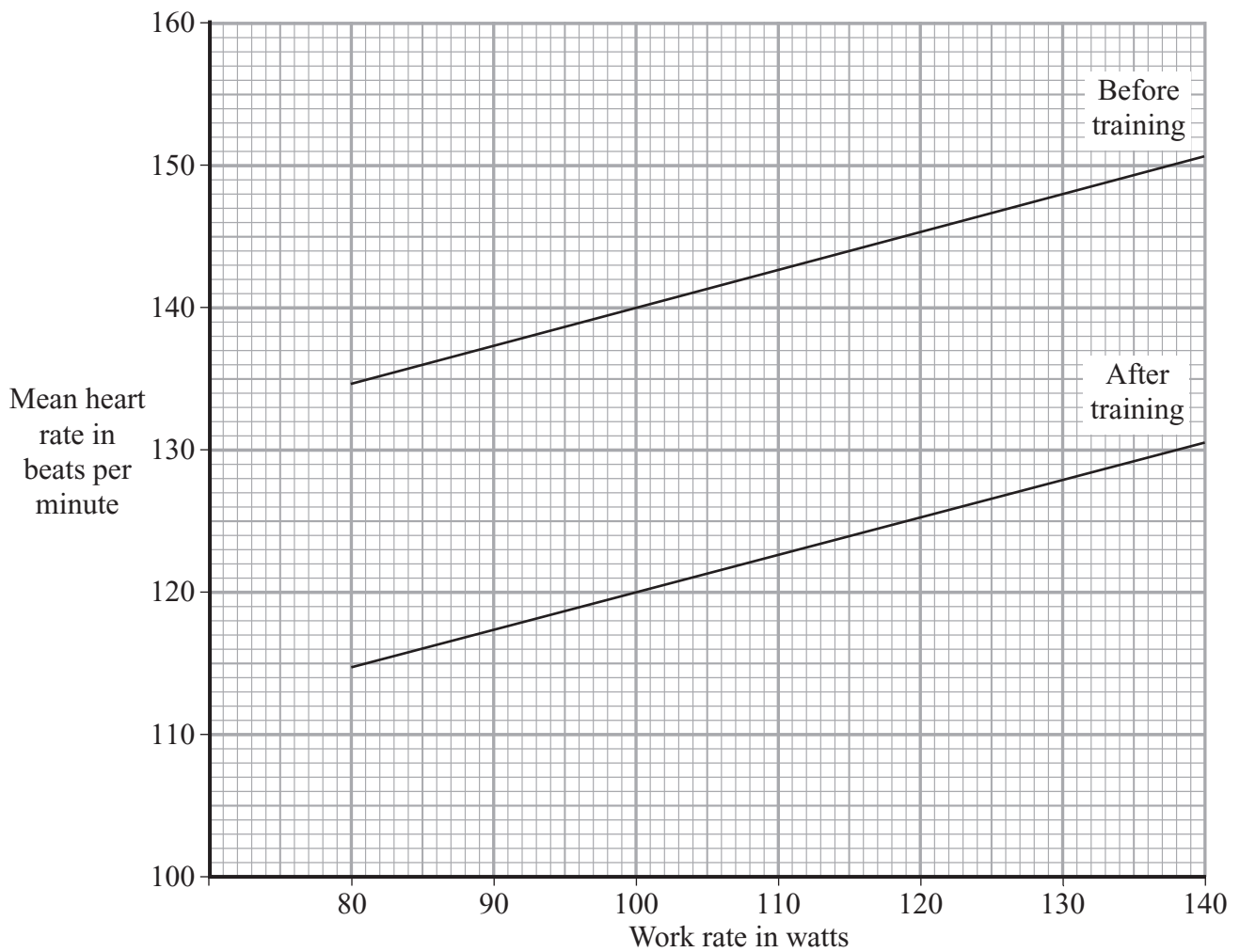
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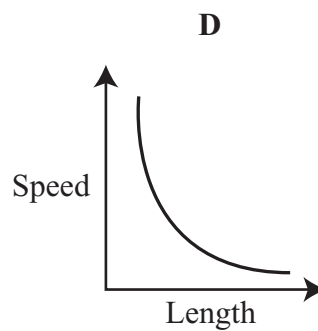
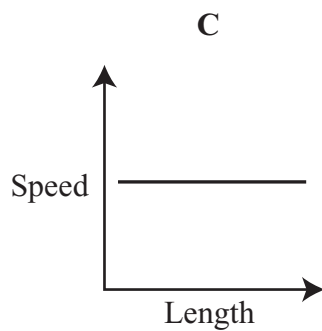
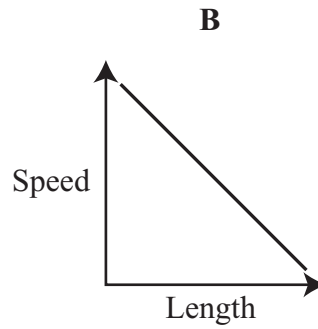
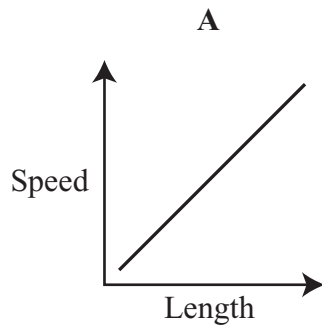
- A 80 cm^3
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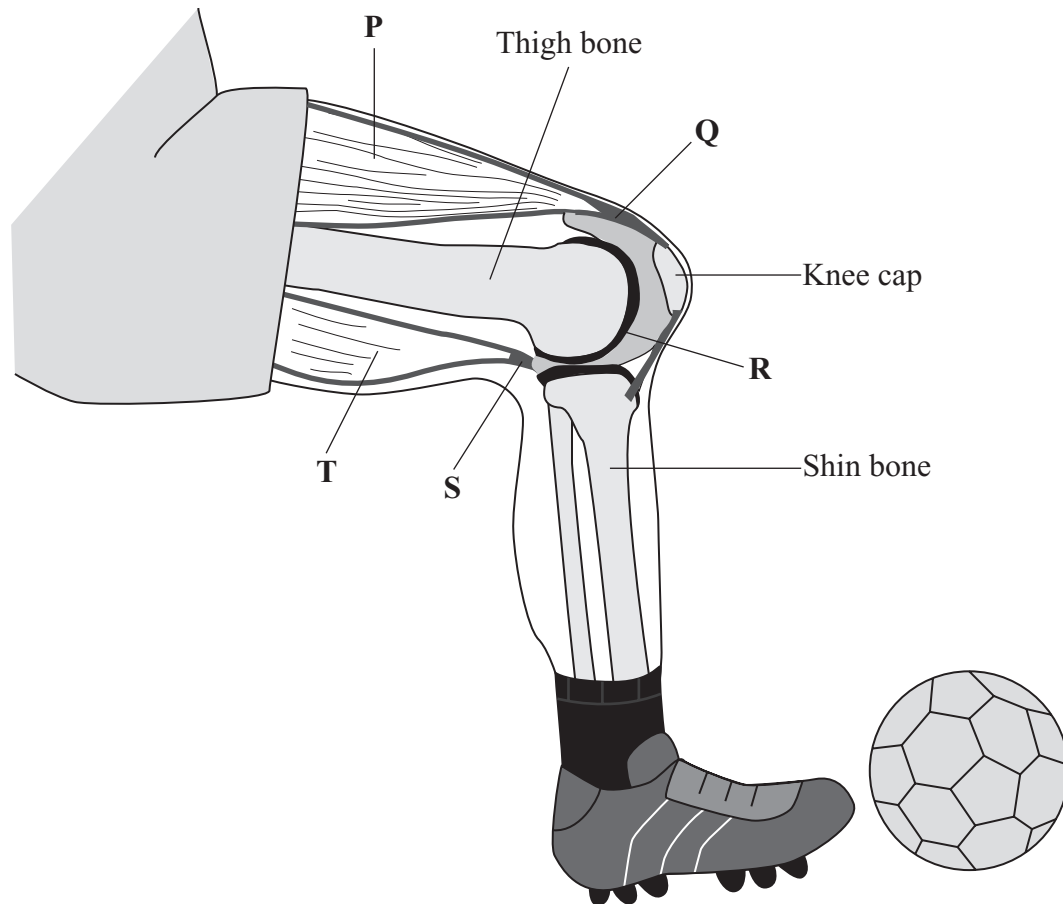
- A action of the paired fins and the small body mass.
- B action of the paired fins and the tail with a large surface area.
- C tail with a large surface area and the small body mass.
- D wave-like movement of the body and the tail with a large surface area.

Turn over for the next question

Turn over ►

QUESTION EIGHT

The drawing shows a section through the knee and the bones and muscles connected to it.



8.1 To kick the ball, . . .

- A P must contract.
- B R must become rigid.
- C S must stretch.
- D T must be flexible.

8.2 If T contracts, . . .

- A the joint will stiffen.
- B the knee will bend more.
- C the knee will relax.
- D the leg will straighten.

8.3 Which structures are tendons?

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

8.4 Bone tissue contains . . .

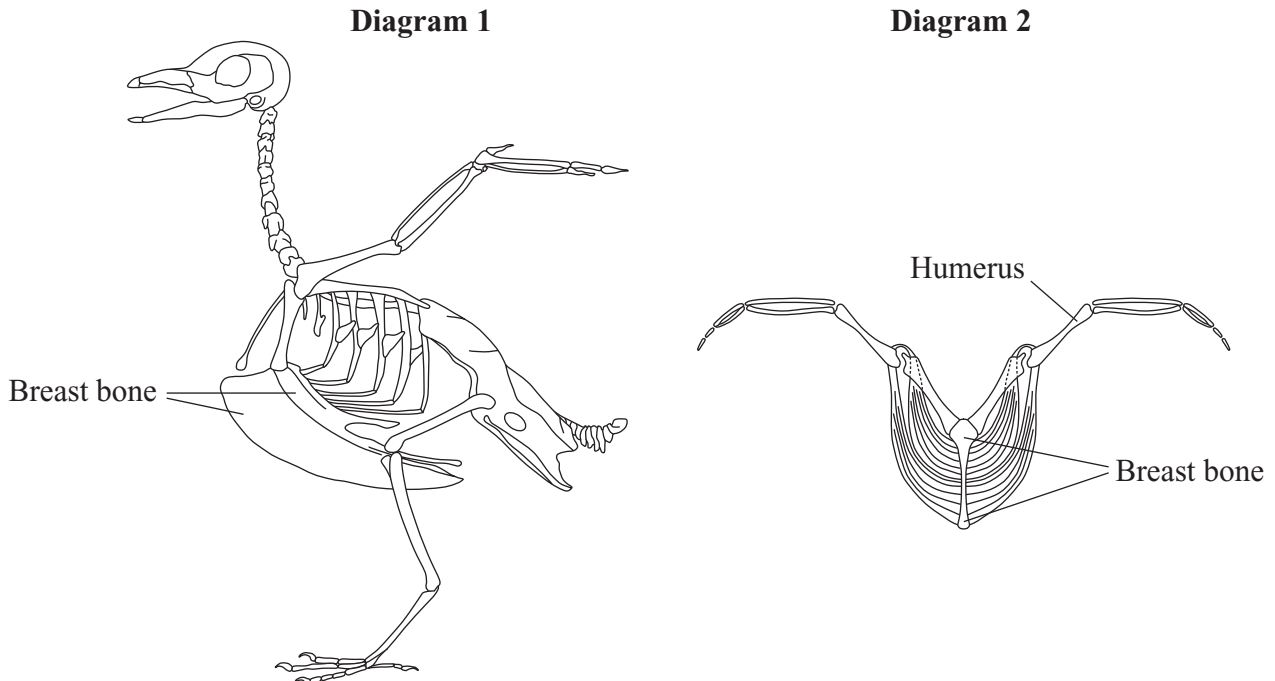
- A calcium compounds, living cells and cartilage.
- B living cells and elastic fibres.
- C protein and cartilage.
- D protein, calcium compounds and living cells.

Turn over for the next question

Turn over ►

QUESTION NINE

Diagram 1 shows the skeleton of a bird. **Diagram 2** shows the breast bone, muscles and wing bones seen from the front.



9.1 The breast bone . . .

- A forms a flexible framework.
- B forms a joint with the wing.
- C generates lift during flight.
- D gives an attachment for flight muscles.

9.2 The wings can be moved up and down because . . .

- A all the muscles contract at the same time.
- B the breast bone gives a large area for attachment of flight feathers.
- C the breast bone is very long.
- D the muscles are joined to opposite sides of the humerus.

- 9.3** Which of the following takes place when a bird flies through the air?
- A** The air pressure above and below the wing is decreased.
 - B** The downbeat of the wing increases the air pressure above and below the wing.
 - C** The flight feathers allow air to flow through the wing during the upstroke.
 - D** The flight feathers are arranged to give the wing a rough surface.
- 9.4** The wing bones are similar to bones in the human arm except that there are . . .
- A** fewer bones attached to the humerus in the wing.
 - B** fewer digits in the wing.
 - C** more wrist bones in the wing.
 - D** no wrist bones in the wing.

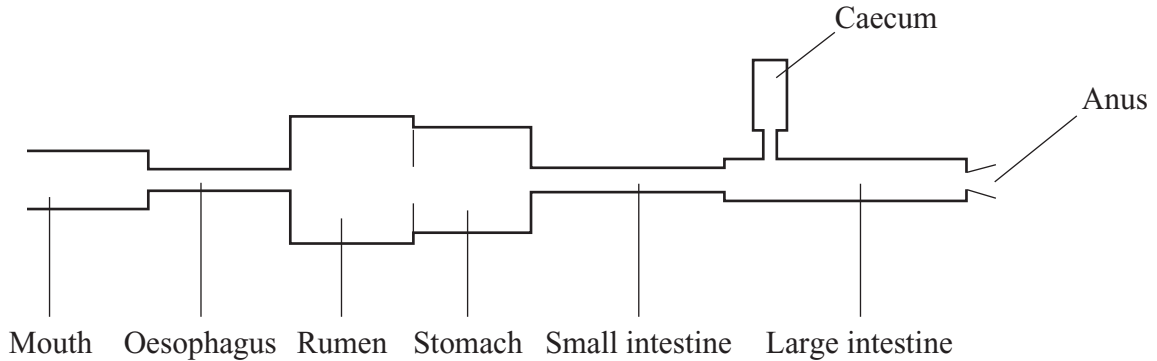
Turn over for the next question

Turn over ►

There are no questions printed on this page

QUESTION TEN

The diagram shows the main parts of a cow's digestive system.



10.1 In which part of the digestive system are cellulose-digesting bacteria found?

- A Duodenum
- B Large intestine
- C Rumen
- D Small intestine

10.2 As part of the digestion of plant material, cows . . .

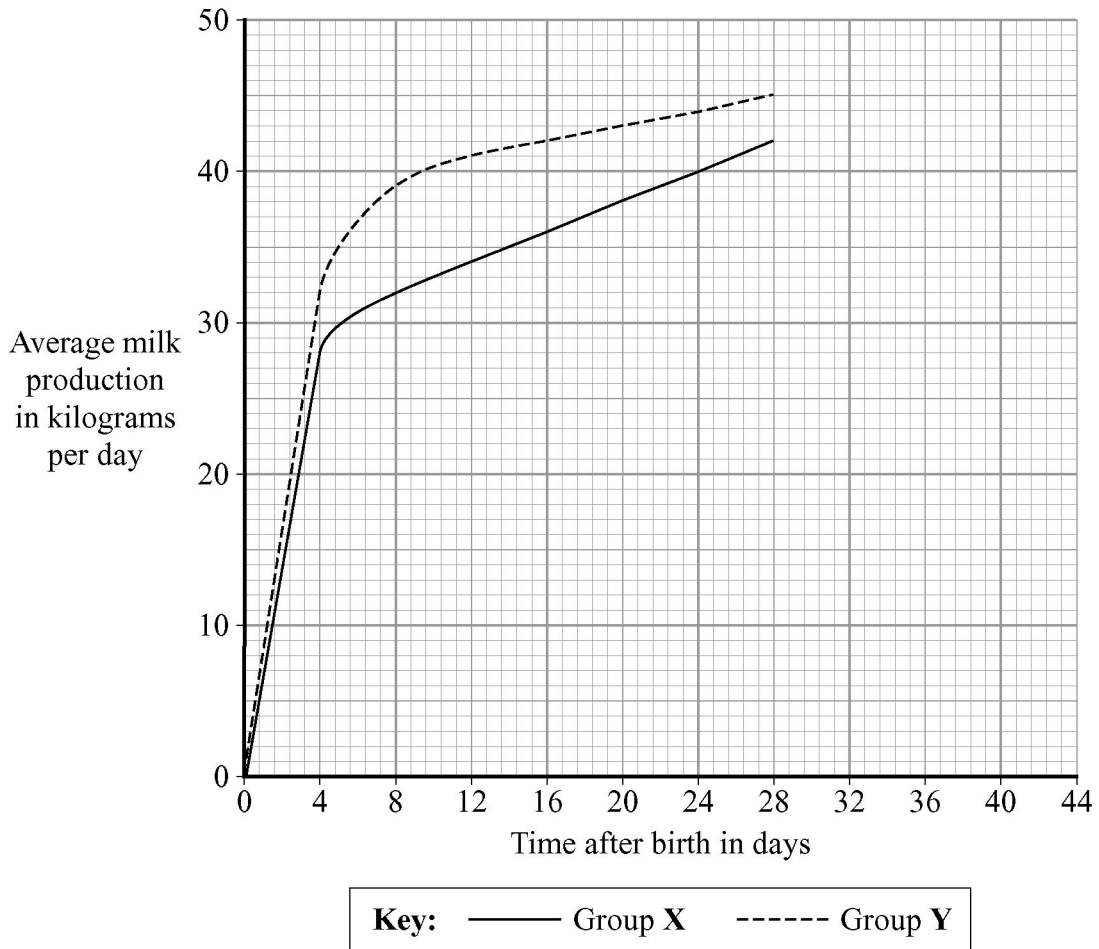
- A do not allow food to remain in the rumen.
- B eat their own faeces.
- C pass food directly from the oesophagus to the small intestine.
- D re-chew their food.

Question 10 continues on the next page

Turn over ►

The graph shows the average daily milk production of two groups of cows, **X** and **Y**, for 28 days after giving birth.

Group **X** was fed a normal diet and Group **Y** was given a yeast supplement to their diet.



10.3 On which two days is the difference in the average milk production between Groups **X** and **Y** the same?

- A Day 4 and day 16
- B Day 4 and day 24
- C Day 12 and day 24
- D Day 12 and day 28

10.4 How many days after birth will the average milk production of Group X and Group Y be the same?

Assume the rate of increase after day 12 stays the same.

A 32

B 36

C 40

D 44

END OF TEST

There are no questions printed on this page