Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature							

General Certificate of Secondary Education
March 2006

SCIENCE: SINGLE AWARD A (MODULAR) 346013
Life and Living Processes (Module 13)

Wednesday 8 March 2006 Morning Session

For this paper you must have:
- a black ball-point pen
- an objective test answer sheet

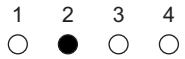
You may use a calculator.

Time allowed: 30 minutes

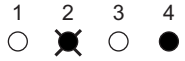
Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Life and Living Processes' printed on it.
- Attempt **one Tier only**, **either** the Foundation 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

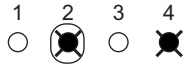
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown:



- 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 drawing shows a lemur. Lemurs feed on tree leaves.

The table is about different receptors in the lemur's body.

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

ear

eye

skin

tongue

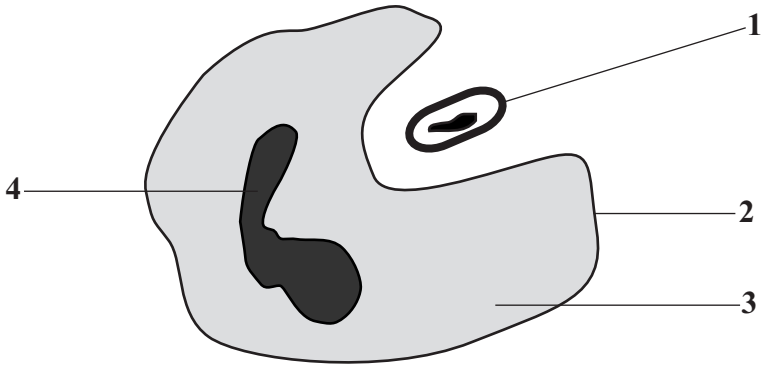
Part of body	Contains receptors which enable the lemur to . . .
1	detect chemicals in the leaves.
2	feel the branches.
3	keep its balance on the branches.
4	see predators.

QUESTION TWO

Bacteria can cause disease in the body.
White blood cells can destroy bacteria by ingesting them.

The diagram shows a white blood cell ingesting a bacterium.

(They are not drawn to the same scale.)



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

cell membrane

cell wall

cytoplasm

nucleus

Turn over for the next question

QUESTION THREE

This question is about substances linked with digestion.

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

enzymes

faeces

fats

sugars

Substance	Link with digestion
1	are broken down by lipase
2	are formed from the breakdown of starch
3	leave the body through the anus
4	speed up the breakdown of large molecules to small molecules

QUESTION FOUR

The body is able to protect itself from microorganisms in a number of ways.

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

acid

mucus

skin

white blood cell

Structure or substance	How the body is protected from microorganisms
1	acts as a barrier
2	destroys microorganisms present in food
3	produces substances to counteract toxins
4	traps microorganisms which we breathe in

QUESTION FIVE

The diagram shows the eye.

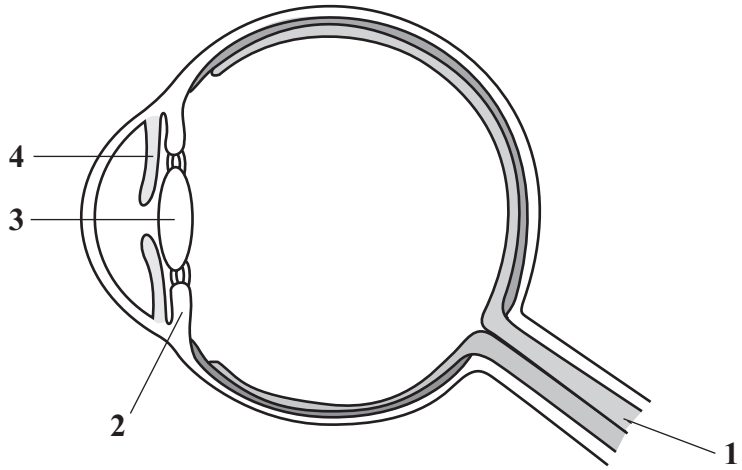
Match words from the list with the labels **1–4** on the diagram.

carries impulses to the brain

contains ciliary muscles

controls the size of the pupil

focuses light on the retina



Turn over for the next question

SECTION B

Questions **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 smoking of cigarettes may damage body organs.

Which **two** of the following organs are most likely to be damaged by the smoking of cigarettes?

blood vessels

brain

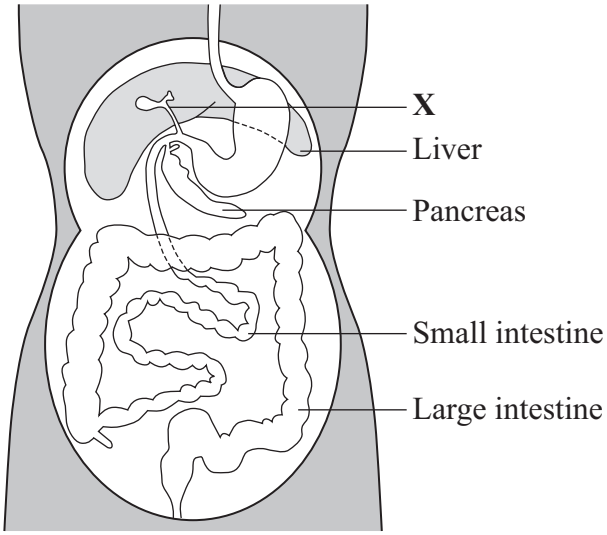
liver

lungs

pancreas

QUESTION SEVEN

The diagram shows parts of the digestive system.



Which **two** of the following would occur if tube **X** were blocked?

acid from the stomach would not be neutralised

bile could not be made by the liver

bile could not reach the intestine

fat-digesting enzymes could not reach the pancreas

starch-digesting enzymes would not be released

Turn over for the next question

SECTION C

Questions **EIGHT** to **TEN**.

Each of these questions has four parts.

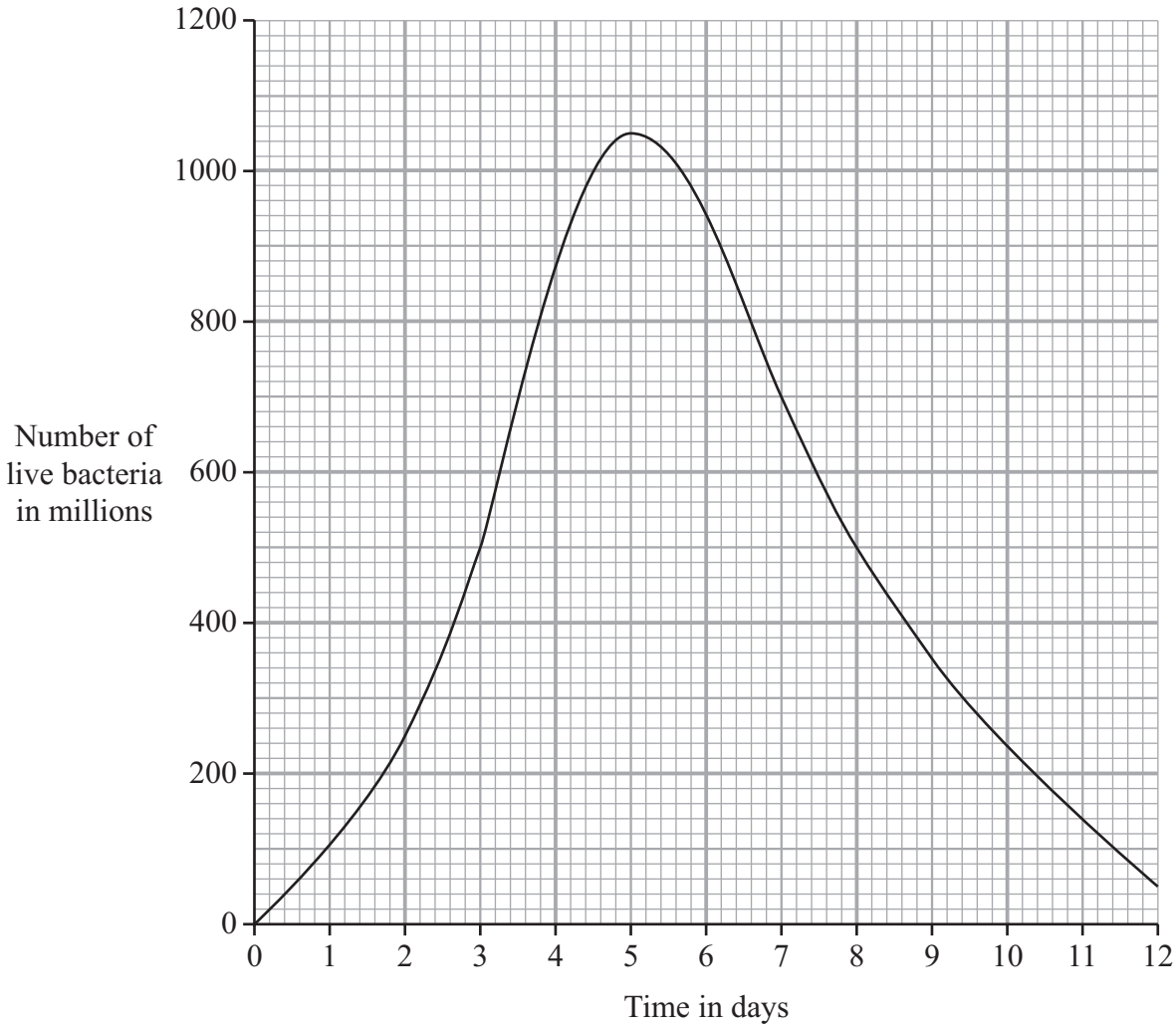
In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION EIGHT

In an investigation, cultures of bacteria were grown on agar plates.

The graph shows the change in the number of live bacteria over a period of 12 days.



8.1 What was the maximum number of live bacteria present?

A 105

B 105 million

C 1050 million

D 1100 million

8.2 How long did it take to reach the maximum number of live bacteria?

A 4.5 days

B 5 days

C 5.5 days

D 12 days

8.3 What do white blood cells produce to destroy live bacteria?

A Amino acids

B Antibodies

C Antitoxins

D Toxins

8.4 Between day 2 and day 3, the number of live bacteria . . .

A doubled.

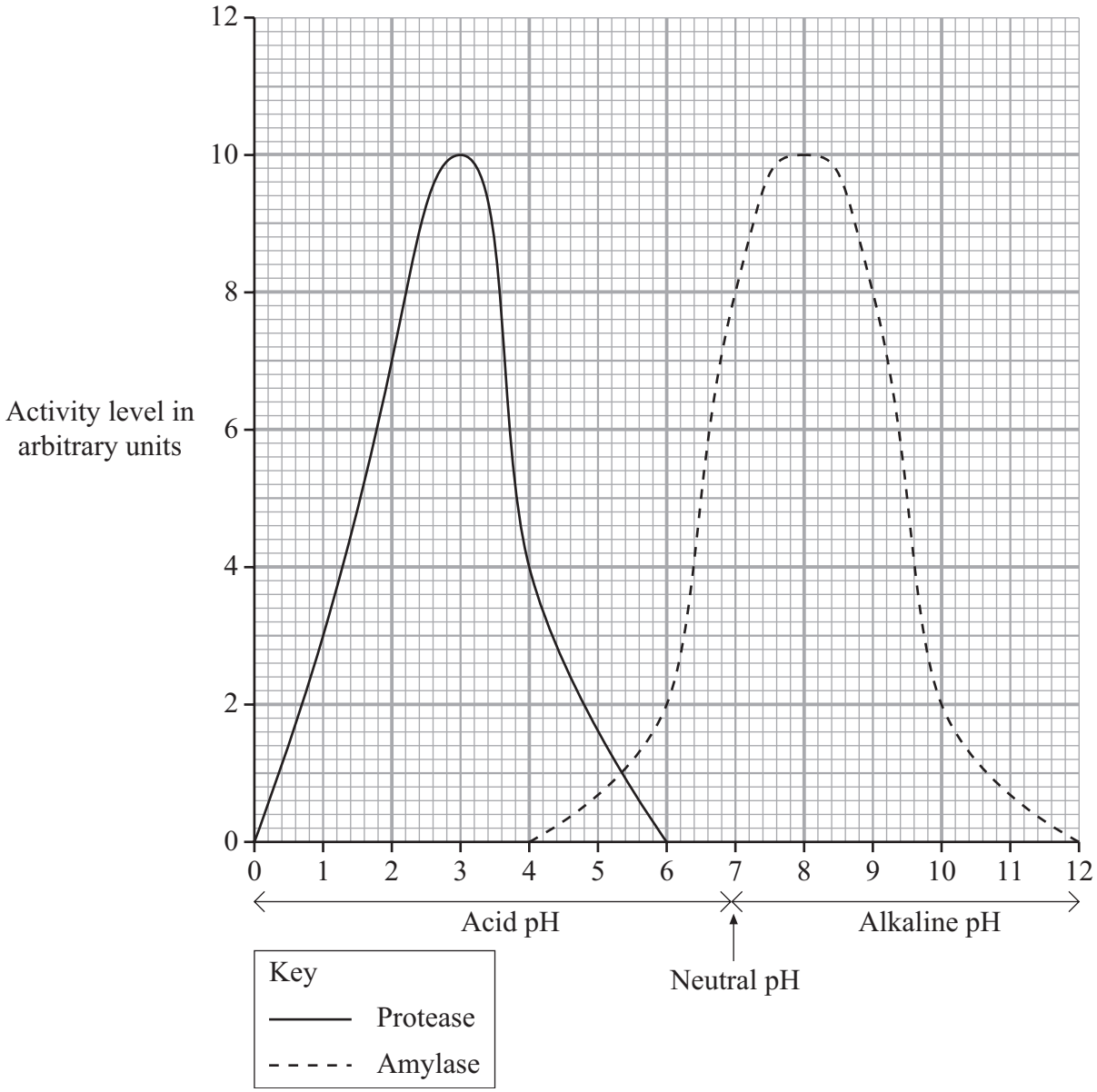
B increased by 50 %.

C increased by $\frac{1}{4}$.

D increased from 25 million to 65 million.

QUESTION NINE

The graph shows how the activity of a protease and an amylase varies with pH.



9.1 At what pH does the amylase work best?

A 3.0

B 5.4

C 8.0

D 10.0

9.2 Which of the following statements is correct?

A The amylase and protease work best in acidic conditions.

B The amylase and protease work best in alkaline conditions.

C The amylase works best in acidic conditions and the protease in alkaline conditions.

D The amylase works best in alkaline conditions and the protease in acidic conditions.

9.3 Which line of the table shows the products of the action of the two enzymes?

	Products of enzyme action	
	Amylase	**Protease**
A	amino acids	amino acids
B	amino acids	sugars
C	sugars	amino acids
D	sugars	sugars

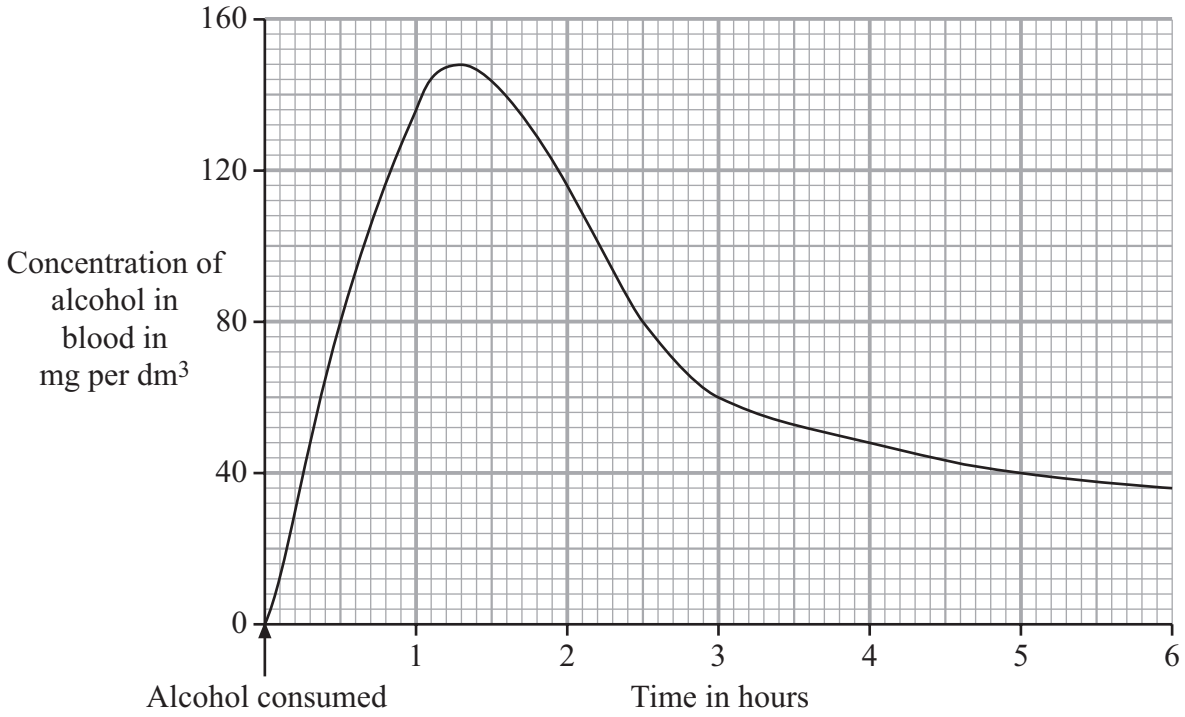
9.4 Which line of the table shows places where these enzymes work?

	Amylase	**Protease**
A	large intestine	small intestine
B	small intestine	stomach
C	stomach	large intestine
D	stomach	small intestine

Turn over for the next question

QUESTION TEN

The graph shows the concentration of alcohol in the blood of a person over a period of several hours after taking a drink of alcohol. The legal limit for the concentration of alcohol in the blood of drivers is 80 mg per dm^3.



10.1 How long did it take for the concentration of alcohol to reach the legal limit?

A 0.5 hours

B 1.3 hours

C 2.5 hours

D 6.0 hours

10.2 Between what times after drinking the alcohol would it be illegal to drive?

A 0 – 0.5 hours

B 0.5 – 2.5 hours

C 1.5 – 3 hours

D 3 – 6 hours

10.3 How is alcohol damaging to the body?

A It damages the lungs, liver and brain.

B It is addictive and causes emphysema.

C It leads to lack of self-control and damages the liver.

D It leads to lack of self-control and damages the lungs.

10.4 Drinking large amounts of alcohol in one evening can cause . . .

A alcohol dependence.

B heart disease.

C lung cancer.

D unconsciousness.

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

The diagram shows the eye.

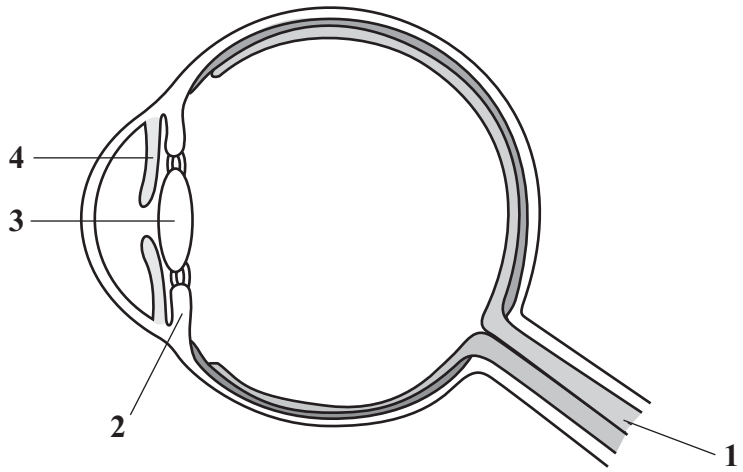
Match words from the list with the labels **1–4** on the diagram.

carries impulses to the brain

contains ciliary muscles

controls the size of the pupil

focuses light on the retina



QUESTION TWO

The function of red blood cells is to transport oxygen around the body.

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

haemoglobin

nucleus

oxygen

oxyhaemoglobin

Red blood cells do not possess a . . . **1** . . . .

They contain a red pigment called . . . **2** . . . .

In the lungs, the red pigment reacts to make . . . **3** . . . .

In the tissues, this splits up to release . . . **4** . . . .

Turn over for the next question

SECTION B

Questions **THREE** and **FOUR**.

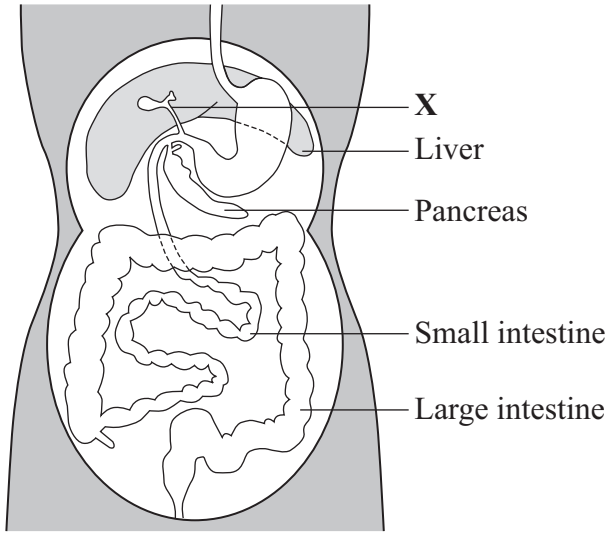
In these questions choose the best **two** answers.

Do **not** choose more than two.

Mark your choices on the answer sheet.

QUESTION THREE

The diagram shows parts of the digestive system.



Which **two** of the following would occur if tube **X** were blocked?

acid from the stomach would not be neutralised

bile could not be made by the liver

bile could not reach the intestine

fat-digesting enzymes could not reach the pancreas

starch-digesting enzymes would not be released

QUESTION FOUR

This question is about digestion.

In which **two** parts of the digestive system does absorption take place?

gullet

large intestine

liver

pancreas

small intestine

Turn over for the next question

SECTION C

Questions **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

In an investigation, cultures of bacteria were grown on agar plates.

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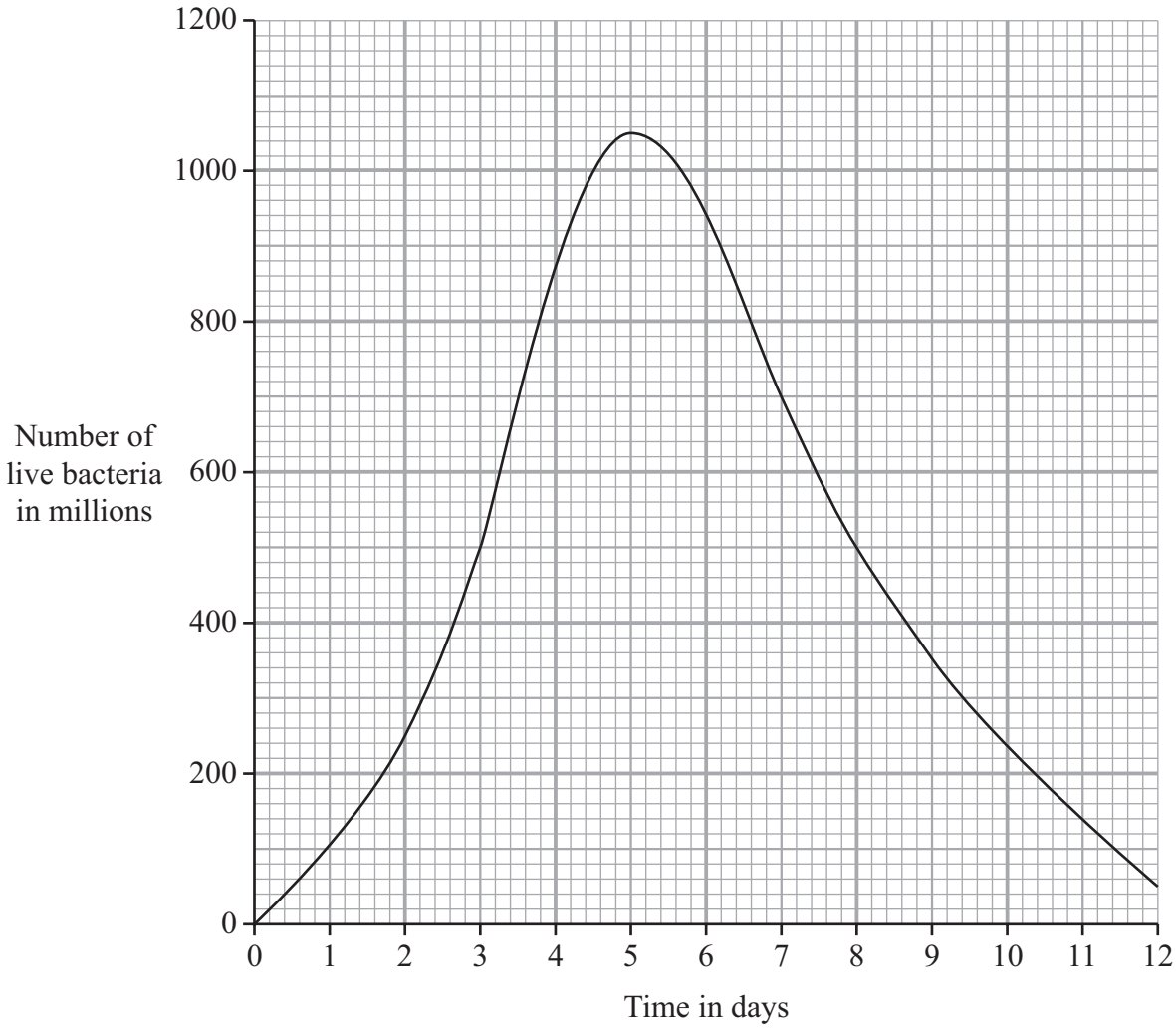

5.1 What was the maximum number of live bacteria present?

A 105

B 105 million

C 1050 million

D 1100 million

5.2 How long did it take to reach the maximum number of live bacteria?

A 4.5 days

B 5 days

C 5.5 days

D 12 days

5.3 What do white blood cells produce to destroy live bacteria?

A Amino acids

B Antibodies

C Antitoxins

D Toxins

5.4 Between day 2 and day 3, the number of live bacteria . . .

A doubled.

B increased by 50 %.

C increased by $\frac{1}{4}$.

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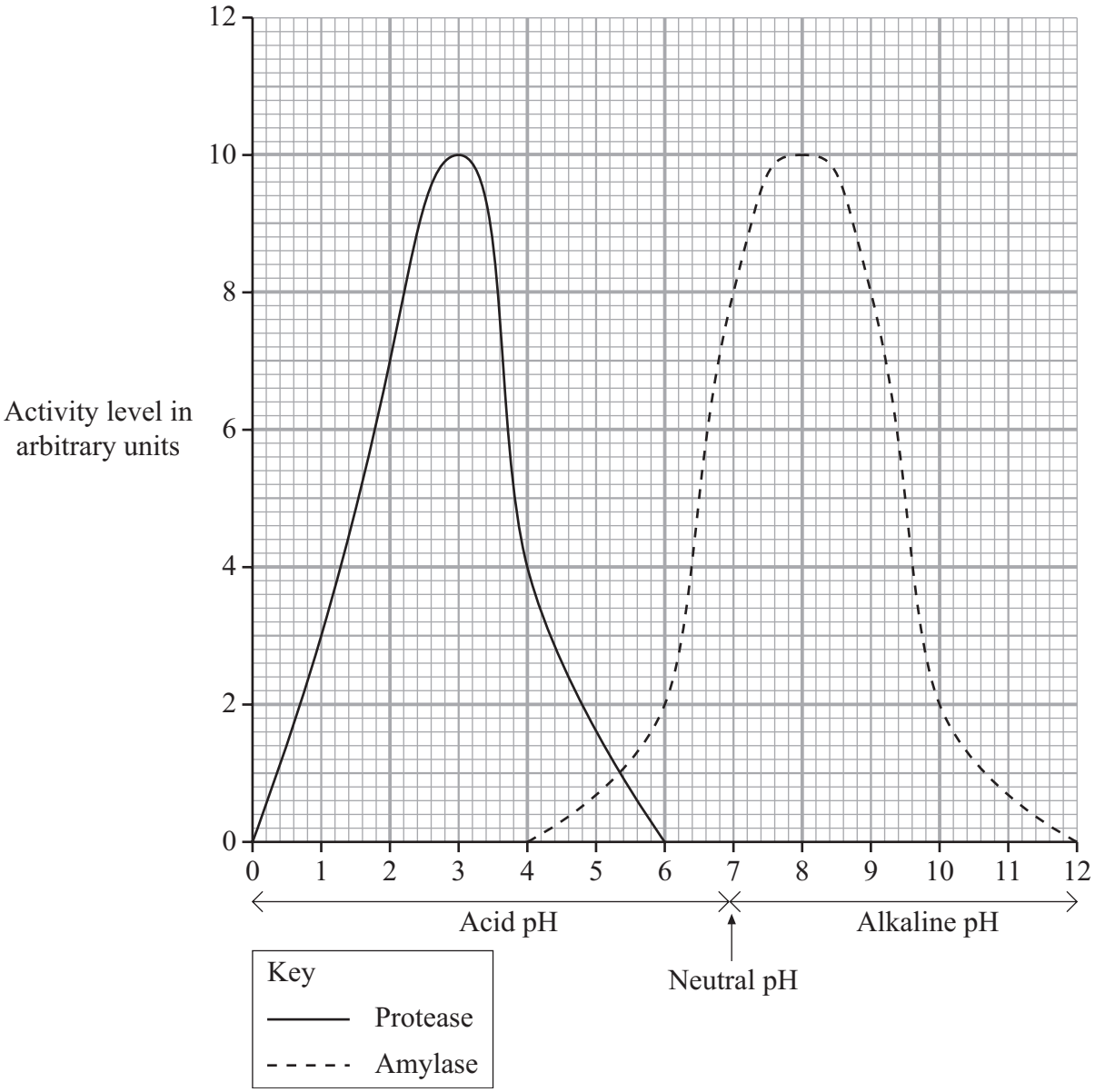
QUESTION SIX

The graph shows how the activity of a protease and an amylase varies with pH.



6.1 At what pH does the amylase work best?

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C 8.0

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6.2 Which of the following statements is correct?

A The amylase and protease work best in acidic conditions.

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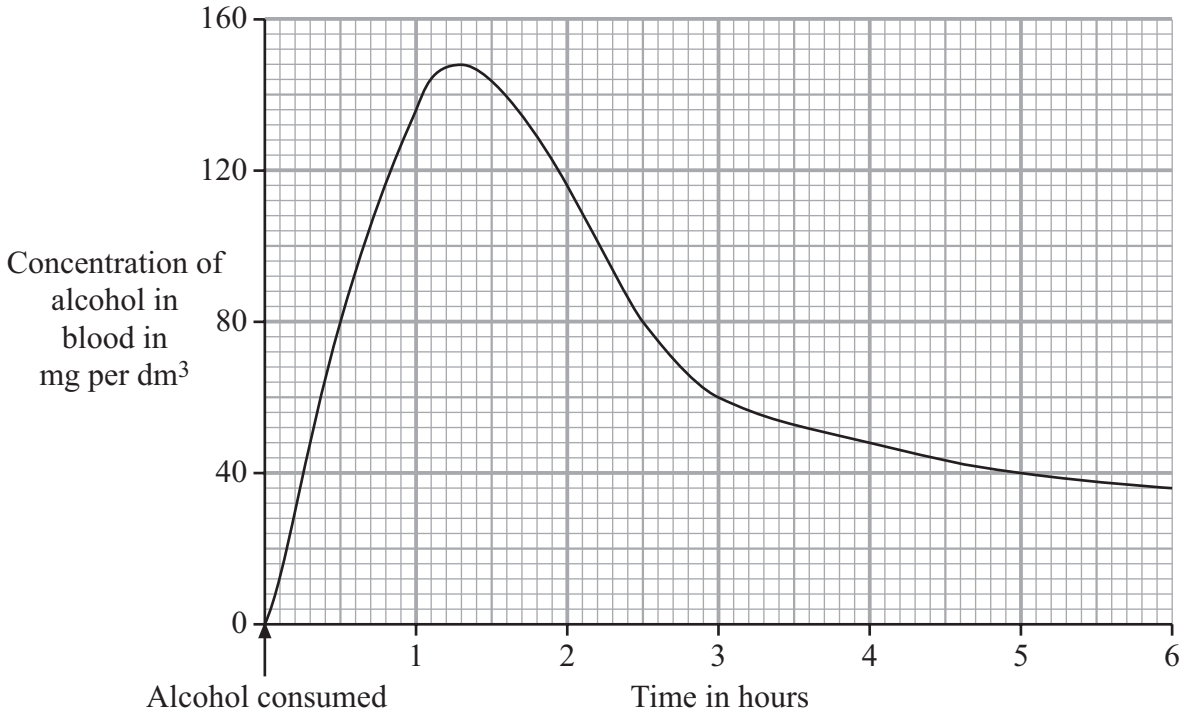
6.4 Which line of the table shows places where these enzymes work?

	Amylase	**Protease**
A	large intestine	small intestine
B	small intestine	stomach
C	stomach	large intestine
D	stomach	small intestine

Turn over for the next question

QUESTION SEVEN

The graph shows the concentration of alcohol in the blood of a person over a period of several hours after taking a drink of alcohol. The legal limit for the concentration of alcohol in the blood of drivers is 80 mg per dm^3.



7.1 How long did it take for the concentration of alcohol to reach the legal limit?

A 0.5 hours

B 1.3 hours

C 2.5 hours

D 6.0 hours

7.2 Between what times after drinking the alcohol would it be illegal to drive?

A 0 – 0.5 hours

B 0.5 – 2.5 hours

C 1.5 – 3 hours

D 3 – 6 hours

7.3 How is alcohol damaging to the body?

A It damages the lungs, liver and brain.

B It is addictive and causes emphysema.

C It leads to lack of self-control and damages the liver.

D It leads to lack of self-control and damages the lungs.

7.4 Drinking large amounts of alcohol in one evening can cause . . .

A alcohol dependence.

B heart disease.

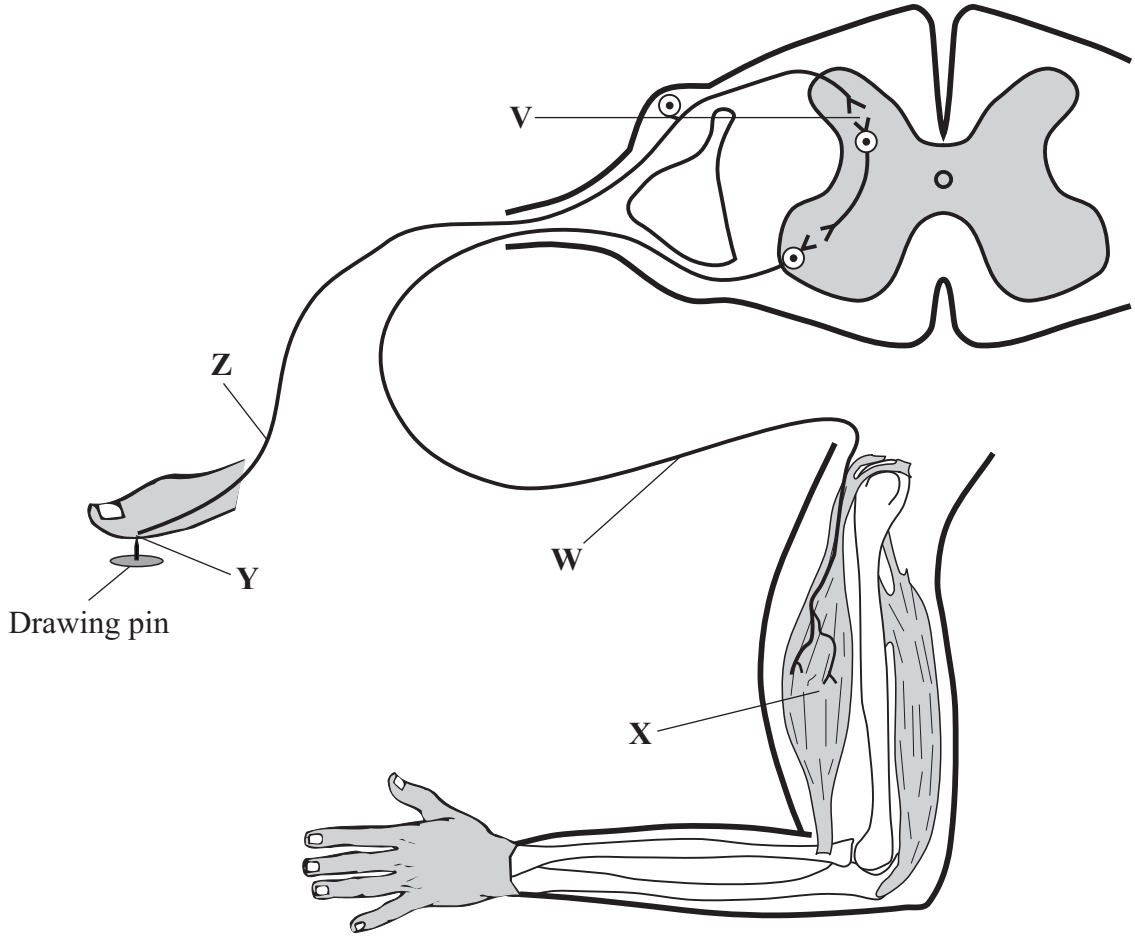
C lung cancer.

D unconsciousness.

Turn over for the next question

QUESTION EIGHT

A student accidentally touches a drawing pin. Her hand is automatically moved away from the pin. The drawing shows the parts involved in this reflex action.



8.1 In this reflex action the receptor is found at . . .

A **W**

B **X**

C **Y**

D **Z**

8.2 In this reflex action the effector is found at . . .

A **W**

B **X**

C **Y**

D **Z**

8.3 Impulses are transmitted across the synapse at **V** by . . .

A a chemical.

B ADH.

C capillaries.

D electricity.

8.4 Which line of the table is correct?

	Type of neurone	
	Motor	**Sensory**
A	**Z**	**W**
B	**W**	**Z**
C	**W**	**W**
D	**Z**	**Z**

Turn over for the next question

QUESTION NINE

The kidney helps to maintain the body's internal environment.

9.1 Which of the following is **all** reabsorbed in the kidney?

A Dissolved ions

B Sugar

C Urea

D Water

9.2 ADH is produced by the . . .

A kidney.

B liver.

C pancreas.

D pituitary gland.

9.3 ADH is produced when . . .

A the blood sugar level is too low.

B the core body temperature is too high.

C the urea content of the blood is too high.

D the water content of the blood is too low.

9.4 What is the result of a rise in the concentration of ADH in the blood?

A The concentration of urine increases.

B The kidneys filter more blood.

C The liver produces more urea.

D The volume of urine increases.

QUESTION TEN

The table shows the amount of sweat produced in cm^3 per hour at rest and during exercise at different air temperatures.

Level of activity	**Sweat produced in cm^3 per hour at different air temperatures**			
	26.7 °C	**32.2 °C**	**37.8 °C**	**43.3 °C**
Rest	47	95	237	567
Exercise	378	710	946	1420

10.1 How much more sweat was produced per hour at 37.8 °C as a result of exercise?

A 615 cm^3

B 709 cm^3

C 719 cm^3

D 946 cm^3

10.2 The best interpretation of the information in the table is that . . .

A exercise reduces sweat production.

B increasing air temperature increases sweat production.

C sweating cools the body.

D sweating only occurs when the air temperature is about 20 °C.

10.3 Core body temperature is controlled by . . .

A receptors in the skin.

B sensors in the muscles.

C sweat glands in the skin.

D the thermoregulatory centre in the brain.

Question 10 continues on the next page

10.4 Which substances are removed from the body by sweating?

A Hormones

B Ions

C Sugars

D Waste gases

END OF TEST