Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
June 2003

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

Tuesday 24 June 2003 Morning Session

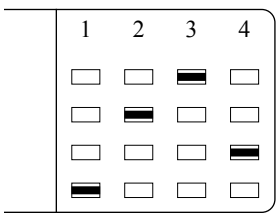
In addition to this paper you will require:
- an HB pencil and a rubber;
- an answer sheet.

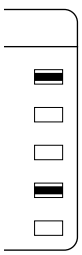
You may use a calculator.

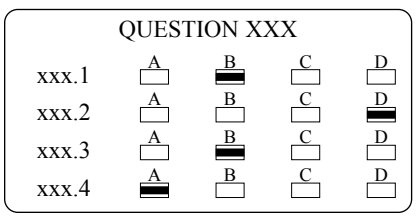
Time allowed: 30 minutes

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 "Life and Living Processes" printed on it.
- Attempt **one Tier only, either** the Foundation Tier **or** the Higher Tier.
- Answer **all** the questions for the Tier you are attempting.
- 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.
- Mark your responses on the separate answer sheet only. Rough work may be done on the question paper.
- Mark the best responses by using a thick pencil stroke to fill in the box. Use an HB pencil. Make sure the pencil stroke does **not** extend beyond the box. Do **not** use ink or ball-point pen. If you wish to change your answer, rub out your first answer completely.
  See below.

Examples:







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 rub 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 12 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

A young puppy explores the garden of his new home.
The table is about the stimuli the puppy detects.

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

ear

eye

nose

skin

Sense organ	Stimulus it detects
1	the shape of a flower pot
2	the temperature of a stone
3	the changing position of his body when jumping around
4	the chemicals given off by an earthworm

QUESTION TWO

The table is about the functions of organs involved in the removal of waste.

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

bladder

kidney

liver

lung

Organ	Function
1	gets rid of carbon dioxide
2	produces urea
3	produces urine
4	stores urine

QUESTION THREE

The diagram shows some of the organs in the human body.

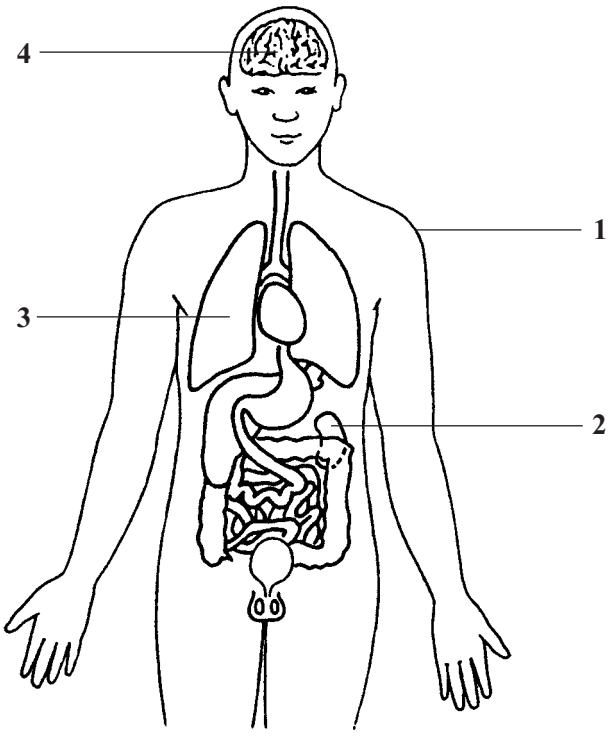
Match words from the list with each of the labels **1–4** on the diagram.

coordinates the body's responses

may develop emphysema

produces sweat

removes excess ions from the blood



QUESTION FOUR

The table is about the effects of some substances on the body.

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

alcohol

carbon monoxide

nicotine

tobacco

Substance	Effect on body
1	may cause lung cancer
2	may cause damage to liver and brain
3	is the addictive substance in cigarettes
4	reduces the amount of oxygen which the blood carries

QUESTION FIVE

The table is about substances used in digestion.

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

bile

hydrochloric acid

lipase

protease

Substance	Part played in digestion
1	catalyses the breakdown of fat into fatty acids
2	catalyses the breakdown of protein into amino acids
3	creates alkaline conditions in the small intestine
4	creates the correct conditions for digestion in the stomach

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

Platelets are found in the blood.

Which **two** of the following are features of platelets?

absorb oxygen from the lungs

have no nucleus

help blood to clot

produce antitoxins

transport urea to the kidneys

QUESTION SEVEN

White blood cells defend the body against bacteria.

Which **two** of the following are produced by white blood cells to defend the body against bacteria?

antibodies

antitoxins

mucus

toxins

vaccine

SECTION C

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

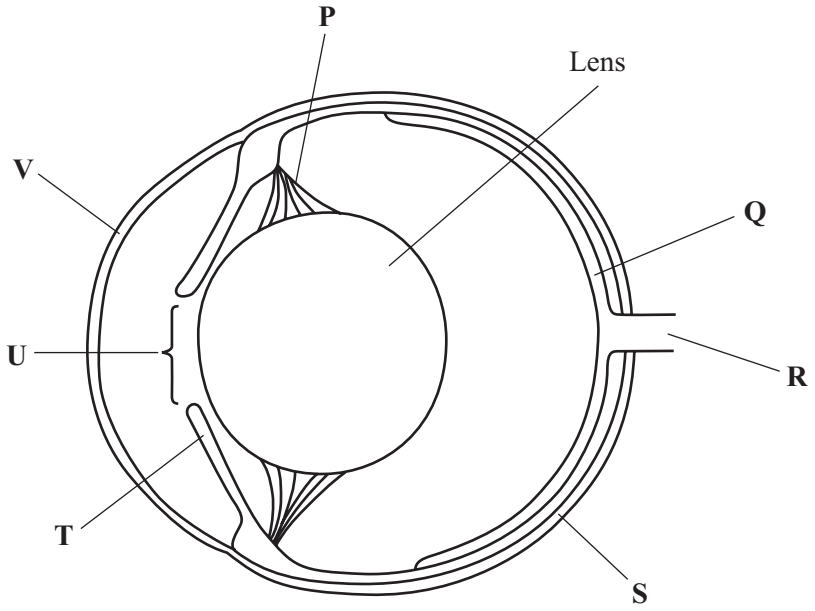
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION EIGHT

The diagram shows a section through the eye of a frog.



8.1 Which part of the eye is most likely to be the cornea?

A **Q**

B **R**

C **S**

D **V**

8.2 Which part is most likely to be the iris?

A **S**

B **T**

C **U**

D **V**

8.3 Structure **P** is most likely to be a . . . . .

A ciliary muscle.

B pupil.

C retina.

D suspensory ligament.

8.4 Receptor cells sensitive to light are most likely to be found in . . . . .

A **Q**

B **R**

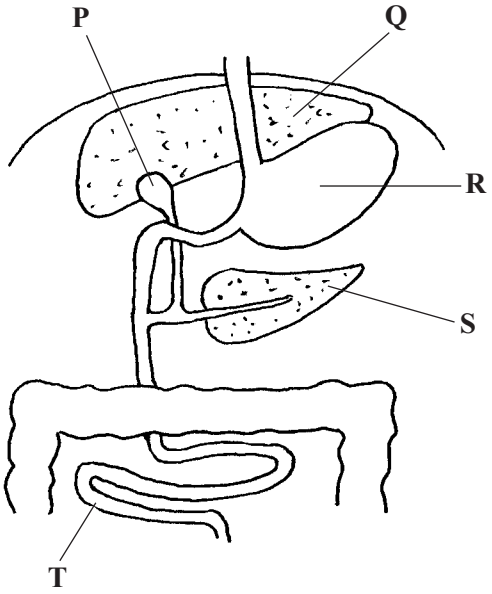
C **S**

D **T**

TURN OVER FOR THE NEXT QUESTION

QUESTION NINE

The diagram shows part of the digestive system.



9.1 The liquid stored in **P** is . . . . .

A bile.

B hydrochloric acid.

C pancreatic juice.

D saliva.

9.2 In which organs is a starch-digesting enzyme produced?

A **P** and **T**

B **Q** and **R**

C **R** and **S**

D **S** and **T**

9.3 In which organ is digested fat absorbed?

A **Q**

B **R**

C **S**

D **T**

9.4 A liquid produced by **Q** . . . . .

A breaks fats into smaller droplets.

B contains digestive enzymes.

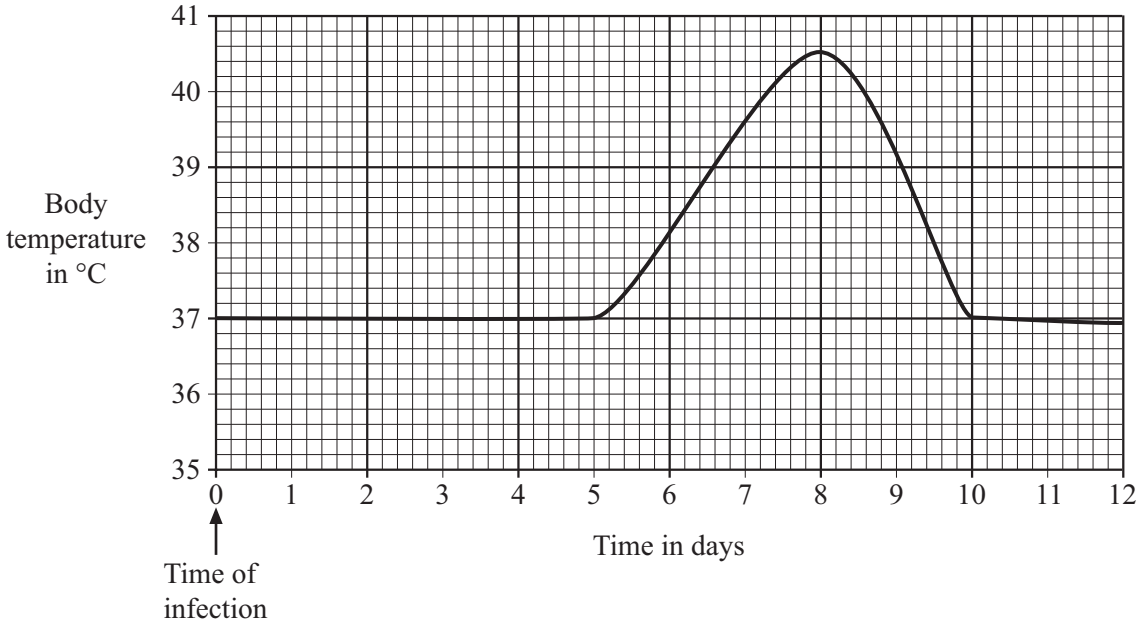
C contains glycerol.

D is acidic.

TURN OVER FOR THE NEXT QUESTION

QUESTION TEN

The graph shows the body temperature of a person suffering from a disease.



10.1 The highest body temperature reached was . . . . .

A 37.0 °C

B 38.0 °C

C 40.5 °C

D 42.0 °C

10.2 How long was the body temperature above normal?

A 2 days

B 5 days

C 8 days

D 10 days

10.3 When toxins are produced by a bacterial infection, the body temperature rises.
Between which times are the greatest number of bacteria likely to be reproducing?

A 0 – 4 days

B 5 – 8 days

C 8 – 10 days

D 10 – 12 days

10.4 When people are vaccinated, they are injected with . . . . .

A dead or weakened microbes.

B drugs to destroy the microbes.

C microbes to destroy toxins.

D white blood cells.

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

The table is about substances used in digestion.

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

bile

hydrochloric acid

lipase

protease

Substance	Part played in digestion
1	catalyses the breakdown of fat into fatty acids
2	catalyses the breakdown of protein into amino acids
3	creates alkaline conditions in the small intestine
4	creates the correct conditions for digestion in the stomach

QUESTION TWO

The table is about the effects which some chemicals have on the body.

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

alcohol

carbon monoxide

nicotine

a solvent

Chemical	Effect on body
1	affects behaviour when inhaled
2	combines irreversibly with haemoglobin
3	makes it difficult to give up smoking
4	slows down the transmission of nerve impulses

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

White blood cells defend the body against bacteria.

Which **two** of the following are produced by white blood cells to defend the body against bacteria?

antibodies

antitoxins

mucus

toxins

vaccine

QUESTION FOUR

Human cells contain mitochondria.

Which **two** of the following are true of mitochondria?

they are found in the cytoplasm

they contain haemoglobin

they control the activity of the cell

they control the passage of chemicals in and out of the cell

they release energy during respiration

SECTION C

Questions **FIVE** to **TEN**.

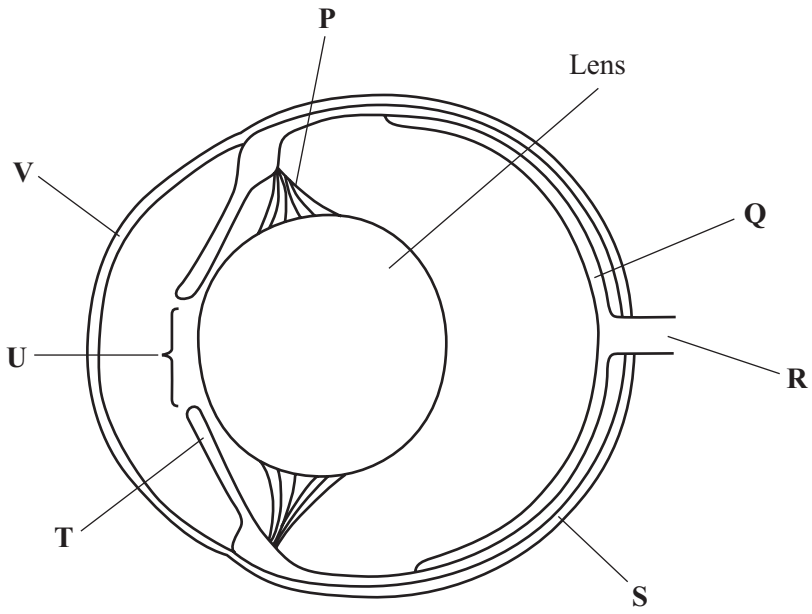
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION FIVE

The diagram shows a section through the eye of a frog.



5.1 Which part of the eye is most likely to be the cornea?

A **Q**

B **R**

C **S**

D **V**

5.2 Which part is most likely to be the iris?

A **S**

B **T**

C **U**

D **V**

5.3 Structure **P** is most likely to be a . . . . .

A ciliary muscle.

B pupil.

C retina.

D suspensory ligament.

5.4 Receptor cells sensitive to light are most likely to be found in . . . . .

A **Q**

B **R**

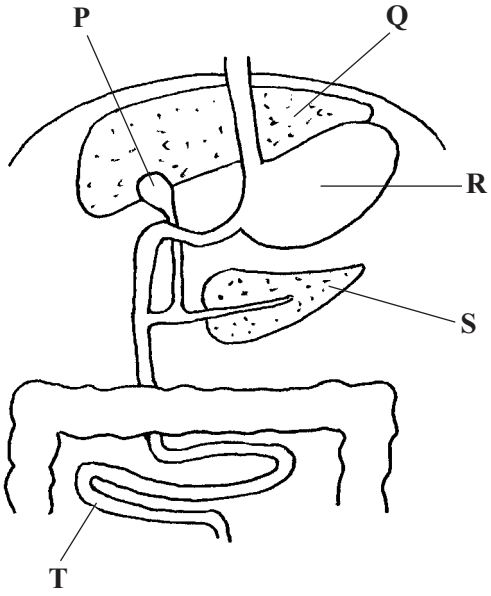
C **S**

D **T**

TURN OVER FOR THE NEXT QUESTION

QUESTION SIX

The diagram shows part of the digestive system.



6.1 The liquid stored in **P** is . . . . .

A bile.

B hydrochloric acid.

C pancreatic juice.

D saliva.

6.2 In which organs is a starch-digesting enzyme produced?

A **P** and **T**

B **Q** and **R**

C **R** and **S**

D **S** and **T**

6.3 In which organ is digested fat absorbed?

A **Q**

B **R**

C **S**

D **T**

6.4 A liquid produced by **Q** . . . . .

A breaks fats into smaller droplets.

B contains digestive enzymes.

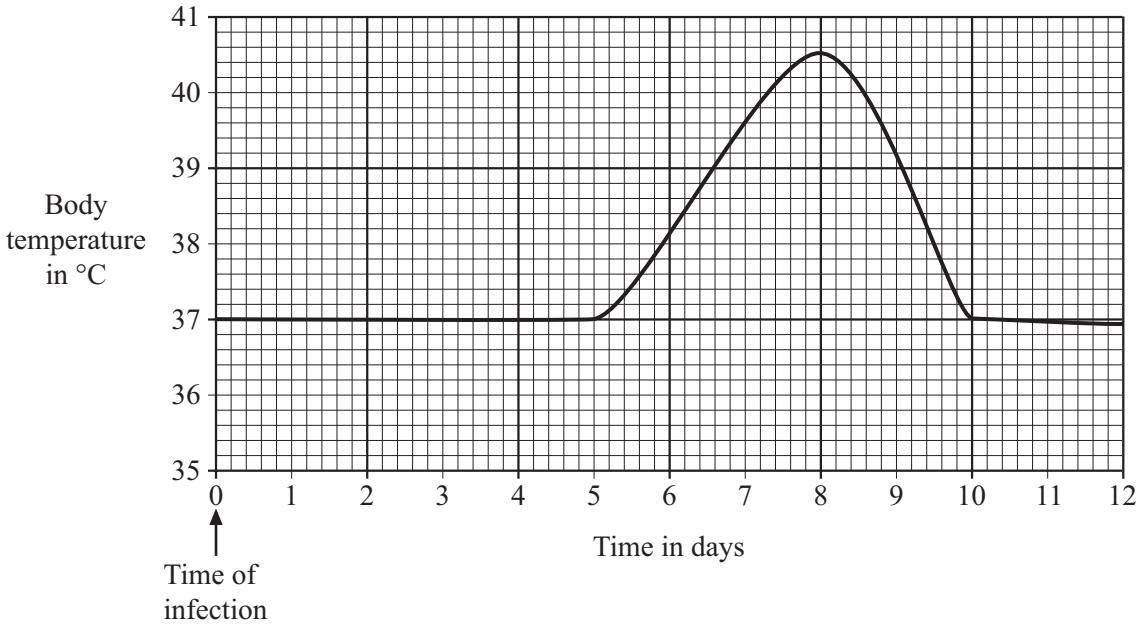
C contains glycerol.

D is acidic.

TURN OVER FOR THE NEXT QUESTION

QUESTION SEVEN

The graph shows the body temperature of a person suffering from a disease.



7.1 The highest body temperature reached was . . . . .

A 37.0 °C

B 38.0 °C

C 40.5 °C

D 42.0 °C

7.2 How long was the body temperature above normal?

A 2 days

B 5 days

C 8 days

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7.3 When toxins are produced by a bacterial infection, the body temperature rises.
Between which times are the greatest number of bacteria likely to be reproducing?

A 0 – 4 days

B 5 – 8 days

C 8 – 10 days

D 10 – 12 days

7.4 When people are vaccinated, they are injected with . . . . .

A dead or weakened microbes.

B drugs to destroy the microbes.

C microbes to destroy toxins.

D white blood cells.

TURN OVER FOR THE NEXT QUESTION

QUESTION EIGHT

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

8.1 Which of the following is **not** reabsorbed in the kidney?

A Glucose

B Mineral ions

C Urea

D Water

8.2 ADH is produced by the . . . . .

A kidney.

B liver.

C pancreas.

D pituitary gland.

8.3 ADH is produced when . . . . .

A the blood sugar level is too low.

B the core temperature is too high.

C the urea content of the blood is too high.

D the water content of the blood is too low.

8.4 A rise in the level of ADH will result in . . . . .

A the concentration of urine increasing.

B the kidneys filtering more blood.

C the liver producing more urea.

D the volume of urine increasing.

QUESTION NINE

Reflex actions are involved in some of the body's responses.

9.1 Which of the following describes the path taken by an impulse in a reflex action?

A effector → sensory neurone → relay neurone → motor neurone

B receptor → sensory neurone → relay neurone → motor neurone

C sensory neurone → motor neurone → relay neurone → synapse

D synapse → receptor → relay neurone → sensory neurone

9.2 The function of a synapse is to . . . . .

A detect changes in temperature.

B produce nerve impulses in a receptor.

C stimulate a gland.

D transfer an impulse from one neurone to another.

9.3 Which of the following is true of motor neurones?

A They begin in receptors

B They occur only in the spinal cord

C They transmit impulses to muscles

D They transmit impulses to the brain

9.4 Which of the following is true of reflex actions?

A The brain always coordinates the responses

B They all involve the spinal cord

C They are all triggered by external stimuli

D They are always automatic

QUESTION TEN

Water is lost from the body in several ways.
The volume of water lost varies with the activity of the person.
The table shows the water loss from the body of an athlete when he is 'not in training' and when he is 'in training'.

	Water loss in cm^3 per day	
Source of water loss	**when not in training**	**when in training**
Urine	1400	500
Skin	500	5300
Faeces	200	200
Lungs	400	550

10.1 The increase in total water loss per day as a result of training is . . . . .

A 2500 cm^3

B 4050 cm^3

C 4500 cm^3

D 6550 cm^3

10.2 The proportion of water lost via the athlete's skin when he is not in training is . . . . .

A 1/53 (1.89%)

B 1/50 (2%)

C 1/25 (4%)

D 1/5 (20%)

10.3 More water is lost from the athlete's skin when he is in training because this . . . . .

A ensures that salt is released onto the skin.

B helps to maintain the correct working temperature for enzymes.

C prevents too much blood from entering the capillaries of the skin.

D removes excess water from the body.

10.4 The reduction in urine volume when he is in training is most likely to be because . . . . .

A faeces are moving faster through the digestive system.

B more urea is produced during exercise.

C the blood plasma of the athlete is more dilute.

D the water lost through the skin has not been replaced quickly enough.

END OF TEST