

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

General Certificate of Secondary Education
Spring 2005



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

346013

Wednesday 2 March 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 “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. 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 14 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 diagrams show a bacterium and a sperm cell.

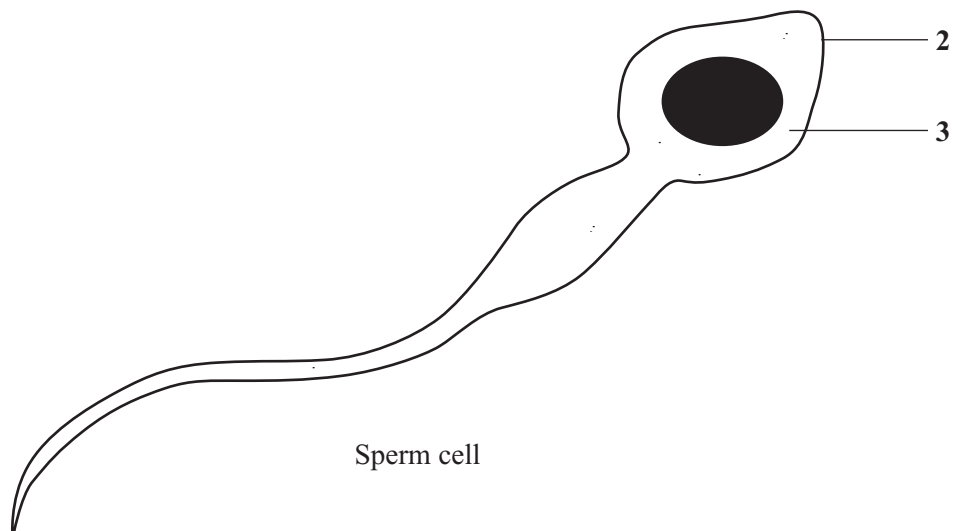
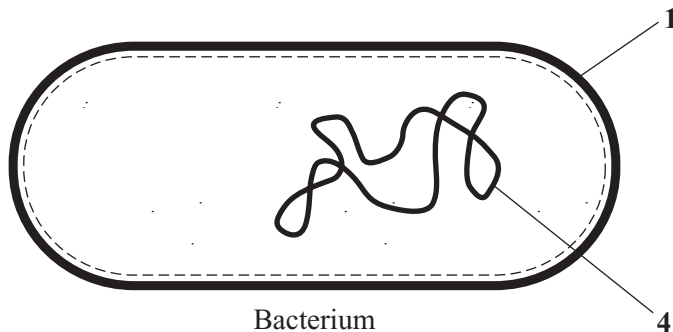
Match words from the list with the labels **1–4** on the diagrams.

cell membrane

cell wall

cytoplasm

genetic material (genes)



QUESTION TWO

The diagram shows the positions of four organs that help to keep conditions inside the body constant.

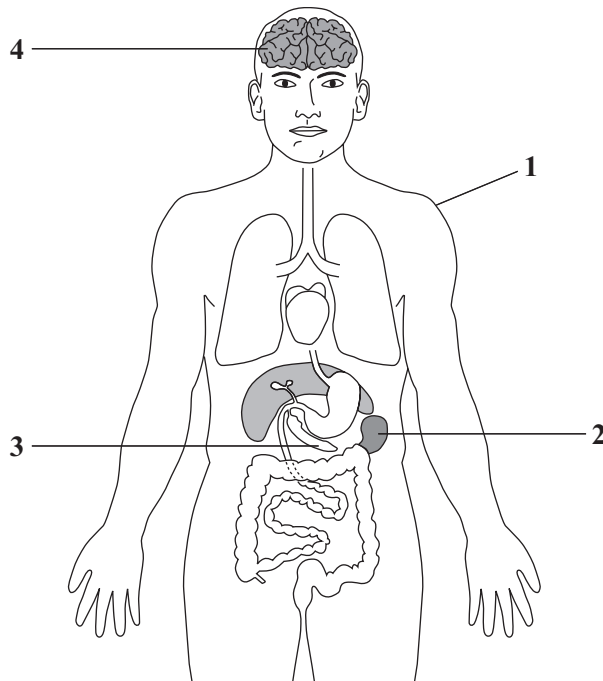
Match words from the list with the labels 1–4 on the diagram.

produces insulin

produces sweat

produces urine

receives impulses from the eye



TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION THREE

The blood transports many substances to different parts of the body.

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

carbon dioxide

glucose

oxygen

urea

Substance	Enters blood from	Leaves blood at
1	liver cells	the kidneys
2	muscle cells	the lungs
3	the lungs	muscle cells
4	the small intestine	muscle cells

QUESTION FOUR

The diagram shows the pathway of impulses in a reflex action.

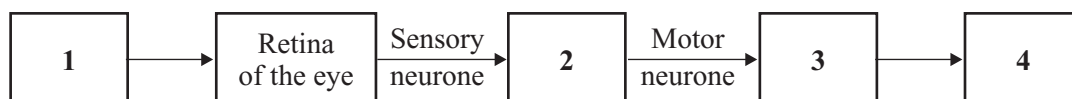
Match words from the list with the labels 1–4 in the diagram.

brain

muscles

response

stimulus



QUESTION FIVE

The diagram shows four parts of human blood.

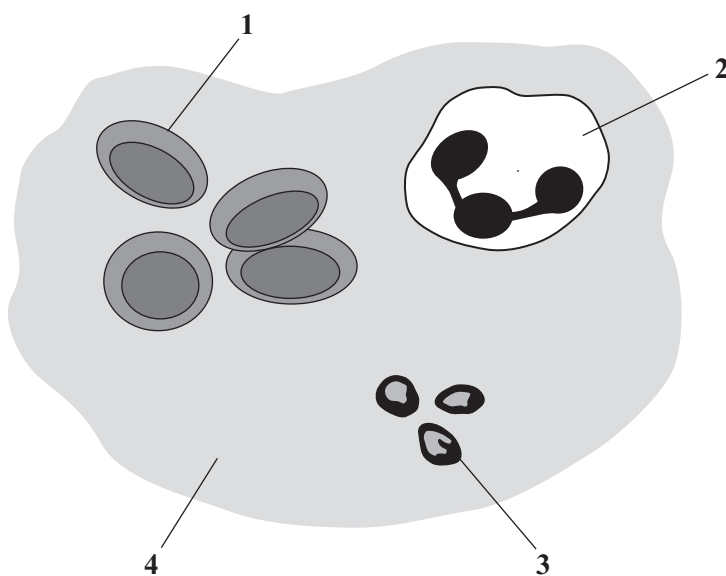
Match words from the list with the labels 1–4 on the diagram.

plasma

platelet

red blood cell

white blood cell



TURN OVER FOR THE NEXT QUESTION

Turn over ►

NO QUESTIONS APPEAR ON THIS PAGE

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 body produces a number of substances.

Which **two** substances are produced by the body to combat infection?**antibodies****antitoxins****bile****toxins****vaccines****QUESTION SEVEN**Which **two** of the following substances are lipids?**fats****oils****protein****starch****sugar**

Turn over ►

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

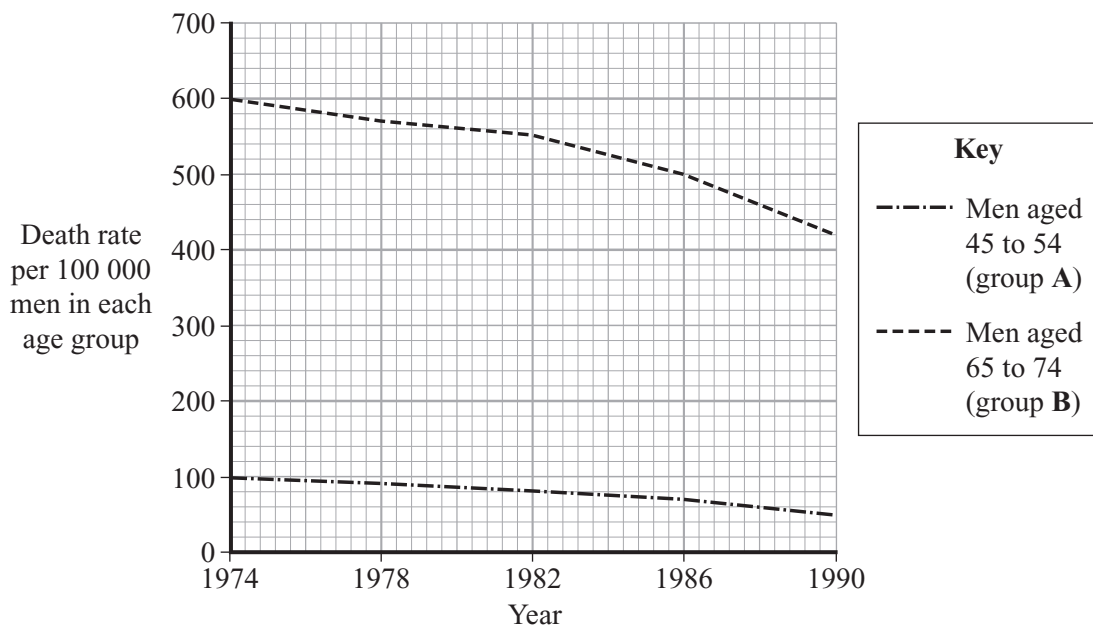
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION EIGHT

The graph shows the death rate from lung cancer among men in two different age groups.



8.1 In a population of one million men aged 65 to 74, how many would have died from lung cancer in 1974?

- A 100
- B 600
- C 4500
- D 6000

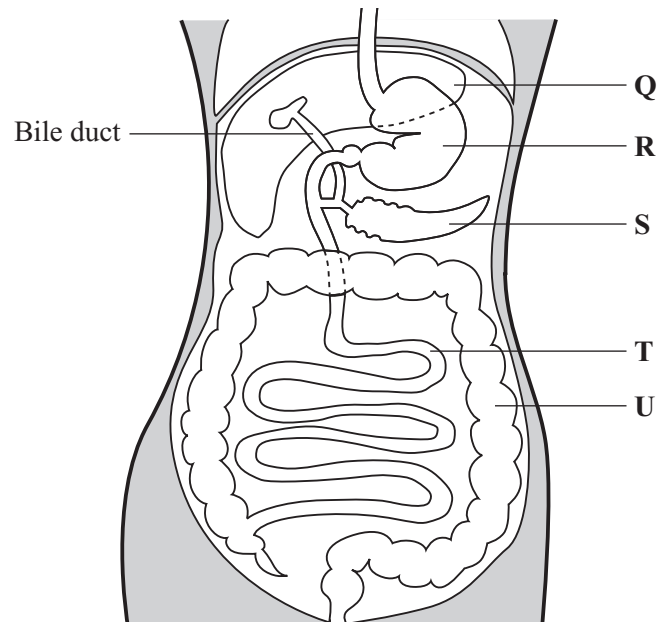
- 8.2** In any particular year, the death rate from lung cancer for men between 55 and 64 years of age is likely to be
- A** between the death rates for age groups **A** and **B**.
 - B** higher than the death rate for age group **B**.
 - C** lower than the death rate for age group **A**.
 - D** the same as the death rate for age group **B**.
- 8.3** The best interpretation of the graph is that
- A** death from lung cancer is more likely in younger men.
 - B** medical care improved from 1974 to 1990.
 - C** more older men die from lung cancer than younger men.
 - D** older men have smoked more cigarettes than younger men.
- 8.4** Lung cancer can be caused by
- A** alcohol.
 - B** drug abuse.
 - C** solvent abuse.
 - D** substances in tobacco smoke.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

The diagram shows some of the structures concerned with digestion.



9.1 Protein digestion occurs in parts

- A** R and S
- B** R and T
- C** S and T
- D** T and U

9.2 What is the role of part **Q** in digestion?

- A** It digests sugars
- B** It produces an enzyme that digests fats
- C** It produces bile which emulsifies fats
- D** It stores excess starch

9.3 The bile duct can be blocked by gall stones.

Which of the following may be a result of this blockage?

- A** Enzymes would not be produced by the pancreas
- B** Fats would not be digested properly
- C** Lipase enzymes would not be produced
- D** Soluble food would not be absorbed into the blood

9.4 The absorption of water takes place mainly in part

- A** R
- B** S
- C** T
- D** U

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

The table gives some information about the number of cases of five infectious diseases.

	Number of cases in thousands				
Year	Whooping cough	Tuberculosis	Measles	Mumps	Rubella
1970	19.4	13.7	155.2	132.6	131.2
1975	9.9	12.6	158.6	100.4	130.5
1980	22.9	10.5	147.9	99.8	76.4
1985	24.2	6.6	104.8	19.6	29.3
1990	16.9	5.9	15.6	3.8	24.5
1995	2.4	6.2	9.0	2.1	11.3
2000	0.9	7.1	2.9	3.4	3.6

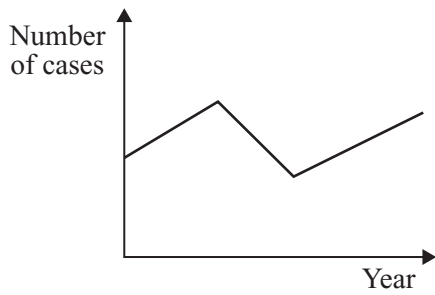
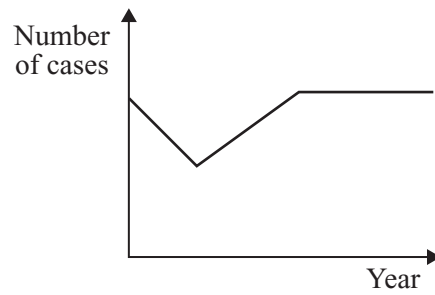
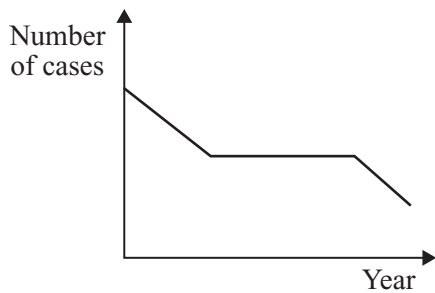
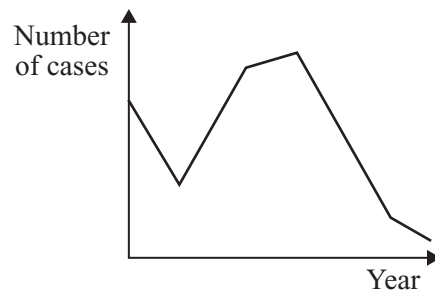
10.1 For which disease did the number of cases fall every five years?

- A Mumps
- B Rubella
- C Tuberculosis
- D Whooping cough

10.2 Between 1970 and 2000, the number of cases (in thousands) of measles fell by

- A 15.23
- B 152.3
- C 2 900
- D 152 300

10.3 Which graph shows the number of cases of whooping cough between 1970 and 2000?

**A****B****C****D**

10.4 A vaccine against a disease contains

- A** a dead or mild form of the microbe that causes the disease.
- B** antibodies from the microbe that causes the disease.
- C** toxins from a person who has recovered from the disease.
- D** white blood cells from a person who has had the disease.

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 diagram shows four parts of human blood.

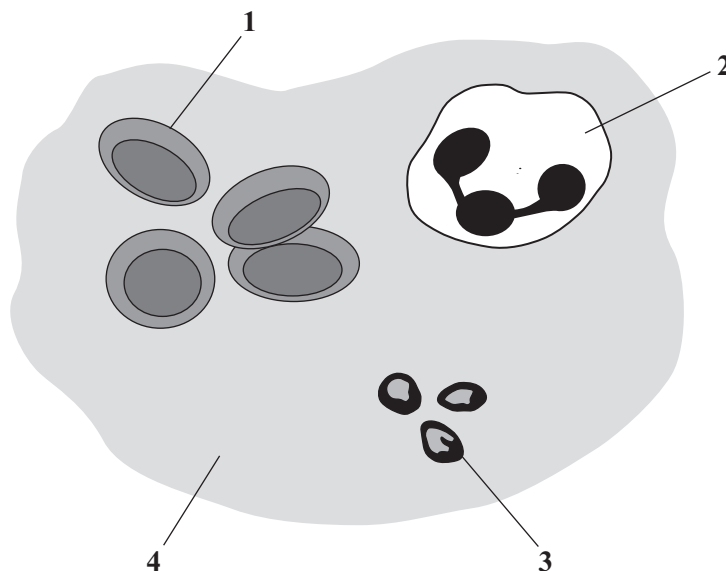
Match words from the list with the labels **1–4** on the diagram.

plasma

platelet

red blood cell

white blood cell



QUESTION TWO

The table is about substances that affect the body.

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

ADH

bile

hydrochloric acid

nicotine

Substance	Description
1	a hormone
2	an addictive substance
3	emulsifies fats
4	kills bacteria in food

TURN OVER FOR THE NEXT QUESTION

Turn over ►

NO QUESTIONS APPEAR ON THIS PAGE

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 body produces a number of substances.

Which **two** substances are produced by the body to combat infection?**antibodies****antitoxins****bile****toxins****vaccines****QUESTION FOUR**Which **two** of the following are the features of red blood cells?**contain haemoglobin****lack a nucleus****produce antibodies****transport carbon dioxide****transport urea****Turn over ►**

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

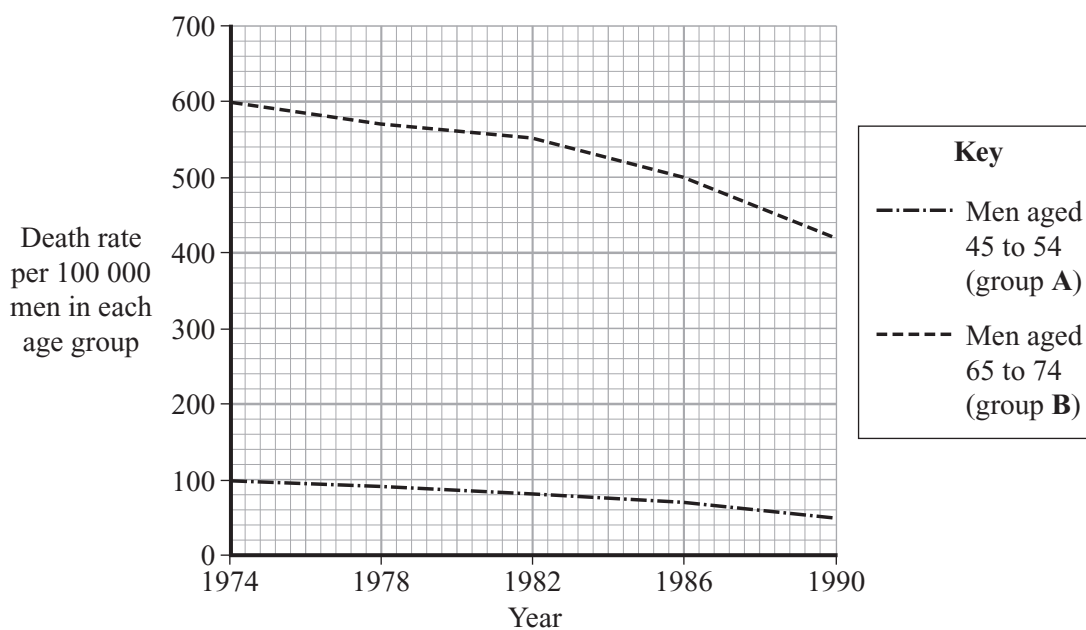
Each of these questions has four parts.

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

Mark your choices on the answer sheet.

QUESTION FIVE

The graph shows the death rate from lung cancer among men in two different age groups.



5.1 In a population of one million men aged 65 to 74, how many would have died from lung cancer in 1974?

- A** 100
- B** 600
- C** 4500
- D** 6000

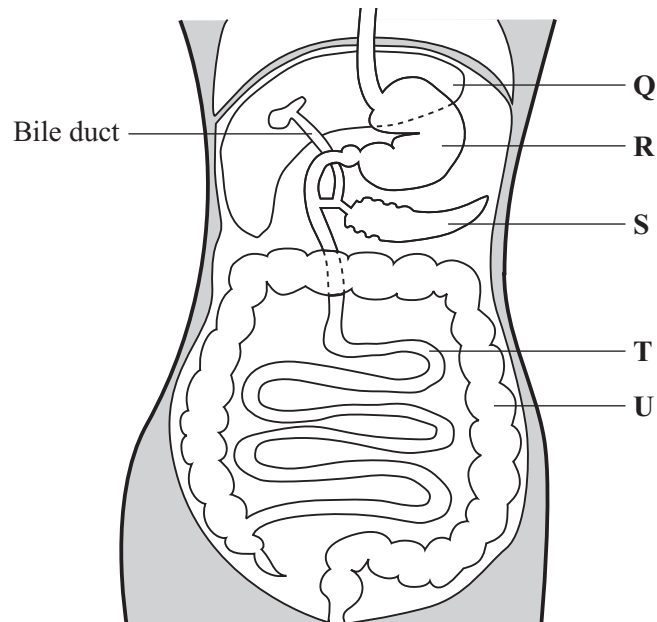
- 5.2** In any particular year, the death rate from lung cancer for men between 55 and 64 years of age is likely to be
- A** between the death rates for age groups **A** and **B**.
 - B** higher than the death rate for age group **B**.
 - C** lower than the death rate for age group **A**.
 - D** the same as the death rate for age group **B**.
- 5.3** The best interpretation of the graph is that
- A** death from lung cancer is more likely in younger men.
 - B** medical care improved from 1974 to 1990.
 - C** more older men die from lung cancer than younger men.
 - D** older men have smoked more cigarettes than younger men.
- 5.4** Lung cancer can be caused by
- A** alcohol.
 - B** drug abuse.
 - C** solvent abuse.
 - D** substances in tobacco smoke.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SIX

The diagram shows some of the structures concerned with digestion.



6.1 Protein digestion occurs in parts

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

6.2 What is the role of part Q in digestion?

- A It digests sugars
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- C It produces bile which emulsifies fats
- D It stores excess starch

6.3 The bile duct can be blocked by gall stones.

Which of the following may be a result of this blockage?

- A Enzymes would not be produced by the pancreas
- B Fats would not be digested properly
- C Lipase enzymes would not be produced
- D Soluble food would not be absorbed into the blood

6.4 The absorption of water takes place mainly in part

- A R
- B S
- C T
- D U

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION SEVEN

The table gives some information about the number of cases of five infectious diseases.

	Number of cases in thousands				
Year	Whooping cough	Tuberculosis	Measles	Mumps	Rubella
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1975	9.9	12.6	158.6	100.4	130.5
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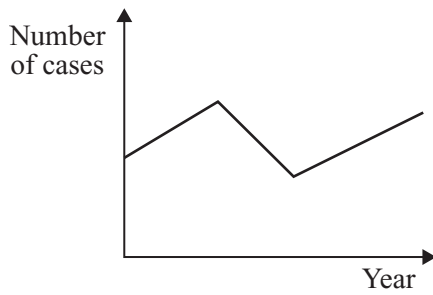
7.1 For which disease did the number of cases fall every five years?

- A** Mumps
- B** Rubella
- C** Tuberculosis
- D** Whooping cough

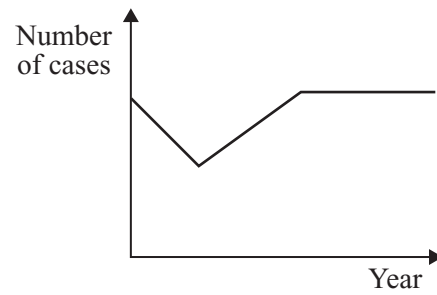
7.2 Between 1970 and 2000, the number of cases (in thousands) of measles fell by

- A** 15.23
- B** 152.3
- C** 2 900
- D** 152 300

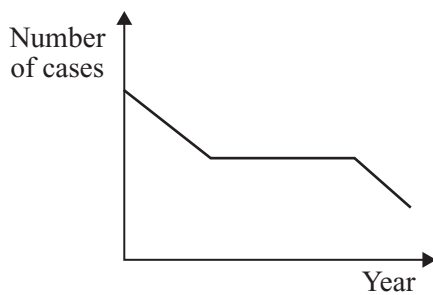
7.3 Which graph shows the number of cases of whooping cough between 1970 and 2000?



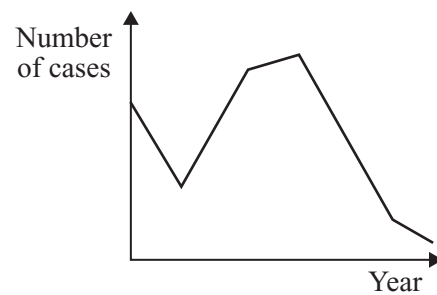
A



B



C



D

7.4 A vaccine against a disease contains

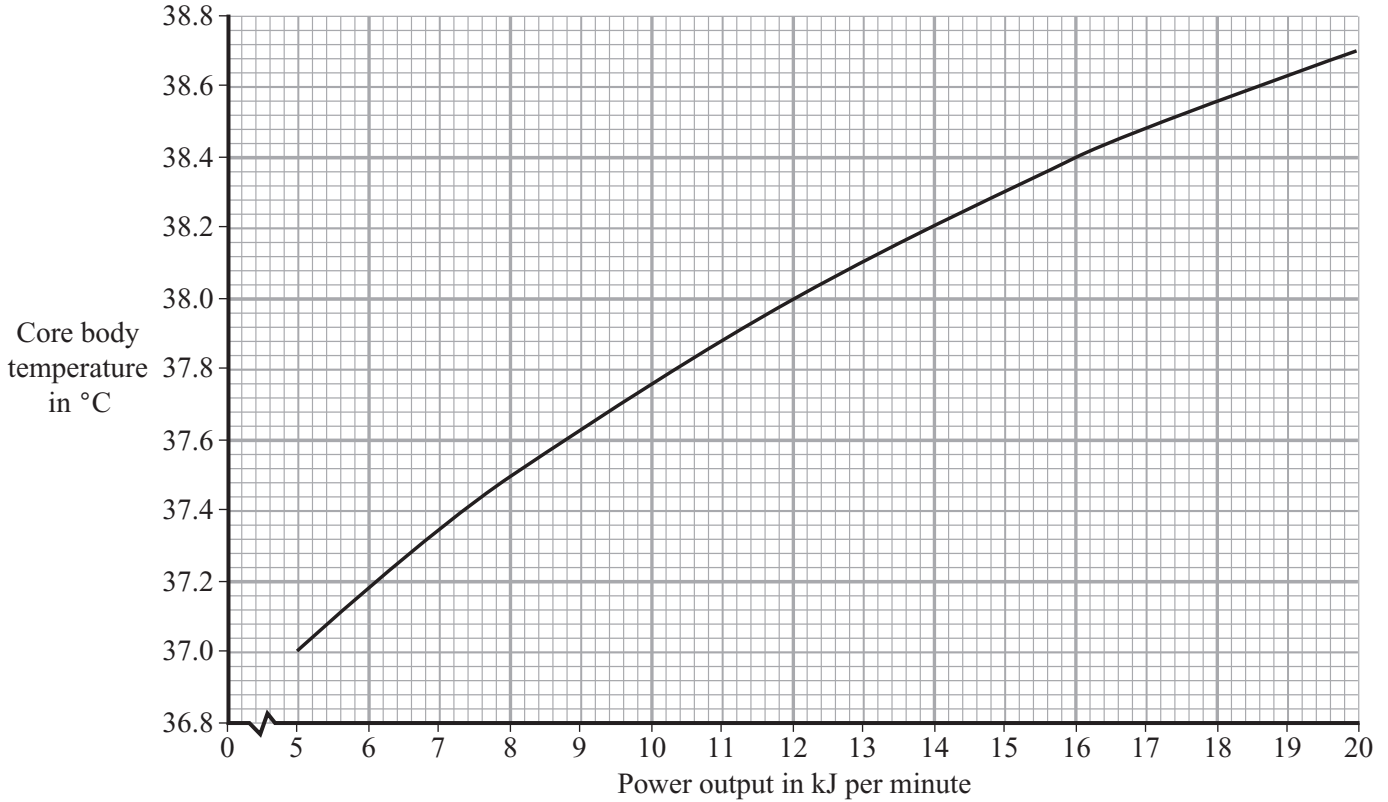
- A a dead or mild form of the microbe that causes the disease.
- B antibodies from the microbe that causes the disease.
- C toxins from a person who has recovered from the disease.
- D white blood cells from a person who has had the disease.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION EIGHT

The graph shows how core body temperature changes as power output increases during exercise.



- 8.1** By how much does the core body temperature change when power output increases from 8 kJ to 12 kJ per minute?
- A 0.05 °C
B 0.50 °C
C 0.70 °C
D 1.20 °C
- 8.2** By how many times does the power output increase when core body temperature increases from 37 °C to 38.3 °C?
- A 2 times
B $2\frac{1}{2}$ times
C 3 times
D $3\frac{1}{2}$ times.

- 8.3** When body temperature rises too high
- A** capillaries move closer to the skin surface.
 - B** more blood passes through the skin capillaries.
 - C** muscles contract rapidly.
 - D** skin capillaries constrict.
- 8.4** The rise in core body temperature is detected by receptors in the
- A** brain.
 - B** heart.
 - C** pituitary gland.
 - D** skin.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION NINE

Table 1 shows the percentage of blood flowing through various parts of the body of a student as the level of exercise increases.

Part of Body	Percentage of blood flowing to parts of body when		
	exercising gently	jogging	running fast
Muscles attached to skeleton	45	65	85
Brain	10	5	3
Heart muscle	5	5	5

Table 1

Table 2 shows the total volume of blood flowing from the heart as the level of exercise increases.

	exercising gently	jogging	running fast
Total volume of blood flowing from heart in cm^3 per minute	9000	18000	30000

Table 2

9.1 When jogging, what volume of blood flows to the muscles attached to the skeleton?

- A 900 cm^3 per minute
- B 4050 cm^3 per minute
- C 11 700 cm^3 per minute
- D 21 250 cm^3 per minute

9.2 As the level of exercise increases, the volume of blood flowing to the brain

- A increases.
- B is 18%.
- C reduces.
- D stays the same.

- 9.3** When running fast, the volume of blood flowing to the heart muscle is
- A** double the volume when jogging.
 - B** more than three times the volume when exercising gently.
 - C** one third of the volume when exercising gently.
 - D** the same volume as when exercising gently.
- 9.4** During exercise, the volume of blood flowing to the digestive system is reduced.
- One result of this is that
- A** the intestines stop producing enzymes.
 - B** the rate of absorption of soluble food decreases.
 - C** the surface area of the villi decreases.
 - D** the temperature of the stomach falls.

TURN OVER FOR THE NEXT QUESTION

Turn over ►

QUESTION TEN

It is important to maintain a constant internal environment in the body.

ADH affects the production of urine to help the body maintain a correct water balance.

The table gives some data on urine production for a healthy person, for a person given additional ADH, and for a person who does not make enough ADH.

Condition	Volume of filtrate produced by kidney in dm³ per day	Volume of urine released in dm³ per day
Healthy person	180	2.5
Person given additional ADH	180	0.5
Person lacking ADH	180	23.3

10.1 What is the difference in urine production between a healthy person and a person given additional ADH?

- A 2.0 dm³ per day
- B 3.0 dm³ per day
- C 22.8 dm³ per day
- D 23.8 dm³ per day

10.2 ADH is produced by the

- A bladder.
- B kidney.
- C pancreas.
- D pituitary gland.

10.3 ADH reduces the volume of urine released by the body by

- A causing more water to be secreted into the tissues.
- B causing the bladder to retain urine for longer.
- C increasing the re-absorption of water and ions from the blood.
- D increasing the re-absorption of water in the kidney.

10.4 Which line in the table is true?

	Blood entering the kidney contains	Urine contains
A	urea, glucose	glucose, urea
B	urea, glucose, ions	glucose, urea
C	urea, glucose, ions	urea, excess ions
D	urea, ions	glucose, urea, excess ions

END OF TEST

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