FOR OFFICIAL USE

Total for Sections B & C

X009/301

NATIONAL QUALIFICATIONS 2010

THURSDAY, 27 MAY 1.00 PM – 3.30 PM

HUMAN BIOLOGY HIGHER

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day Month Year

Scottish candidate number

Number of seat

SECTION A—(30 marks)

Instructions for completion of Section A are given on page two.

For this section of the examination you must use an **HB pencil**.

SECTIONS B AND C—(100 marks)

1 (a) All questions should be attempted.

(b) It should be noted that in **Section C** questions 1 and 2 each contain a choice.

2 The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, **and must be written clearly and legibly in ink**.

3 Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the Invigilator and should be inserted inside the **front** cover of this book.

4 The numbers of questions must be clearly inserted with any answers written in the additional space.

5 Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written. If further space is required a supplementary sheet for rough work may be obtained from the Invigilator.

6 Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.

Read carefully

1 Check that the answer sheet provided is for **Human Biology Higher (Section A)**.

2 For this section of the examination you must use an **HB pencil**, and where necessary, an eraser.

3 Check that the answer sheet you have been given has **your name**, **date of birth**, **SCN** (Scottish Candidate Number) and **Centre Name** printed on it.

Do not change any of these details.

4 If any of this information is wrong, tell the Invigilator immediately.

5 If this information is correct, **print** your name and seat number in the boxes provided.

6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then, using your pencil, put a horizontal line in the space provided (see sample question below).

7 There is **only one correct** answer to each question.

8 Any rough working should be done on the question paper or the rough working sheet, **not** on your answer sheet.

9 At the end of the examination, put the **answer sheet for Section A inside the front cover of this answer book**.

Sample Question

The digestive enzyme pepsin is most active in the

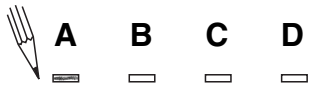
A stomach

B mouth

C duodenum

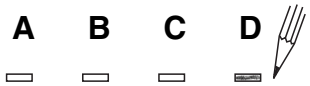
D pancreas.

The correct answer is **A—**stomach. The answer **A** has been clearly marked in **pencil** with a horizontal line (see below).



Changing an answer

If you decide to change your answer, carefully erase your first answer and, using your pencil, fill in the answer you want. The answer below has been changed to **D**.

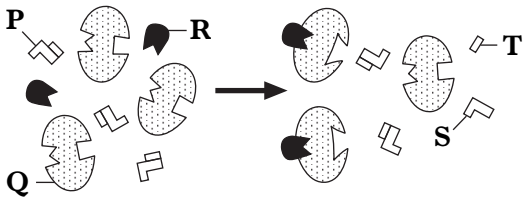


SECTION A

All questions in this section should be attempted.

Answers should be given on the separate answer sheet provided.

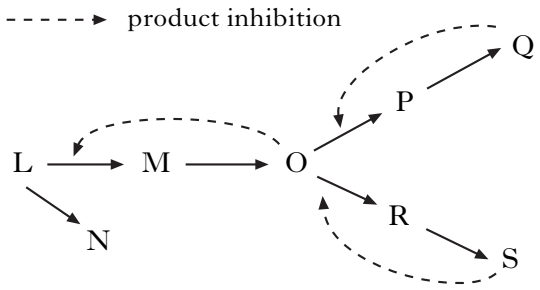
1. The diagram below shows an enzyme-catalysed reaction taking place in the presence of an inhibitor.



Which line in the table below identifies correctly the molecules in the reaction?

	Inhibitor	*Substrate*	*Product*
A	P	R	S
B	Q	P	S
C	R	P	T
D	R	Q	T

2. The following diagram shows a branched metabolic pathway.



Which reaction would tend to occur if both Q and S are present in the cell in high concentrations?

A L → M

B R → S

C O → P

D L → N

3. A fragment of DNA was found to have 120 guanine bases and 60 adenine bases. What is the total number of sugar molecules in this fragment?

A 60

B 90

C 180

D 360

4. The following information refers to protein synthesis.

tRNA anticodon	*amino acid carried by tRNA*
G U G	Histidine (his)
C G U	Alanine (ala)
G C A	Arginine (arg)
A U G	Tyrosine (tyr)
U A C	Methionine (met)
U G U	Threonine (thr)

What order of amino acids would be synthesised from the base sequence of DNA shown?

Base sequence of DNA

C G T T A C G T G

A arg - tyr - his

B ala - met - his

C ala - tyr - his

D arg - tyr - thr

5. In which of the following is the cell organelle listed correctly with its function?

	Cell organelle	*Function*
A	Mitochondrion	Anaerobic respiration
B	Ribosome	Release of ATP
C	Lysosome	Synthesis of enzymes
D	Nucleolus	Synthesis of RNA

6. Carrier molecules involved in the process of active transport are made of

A protein

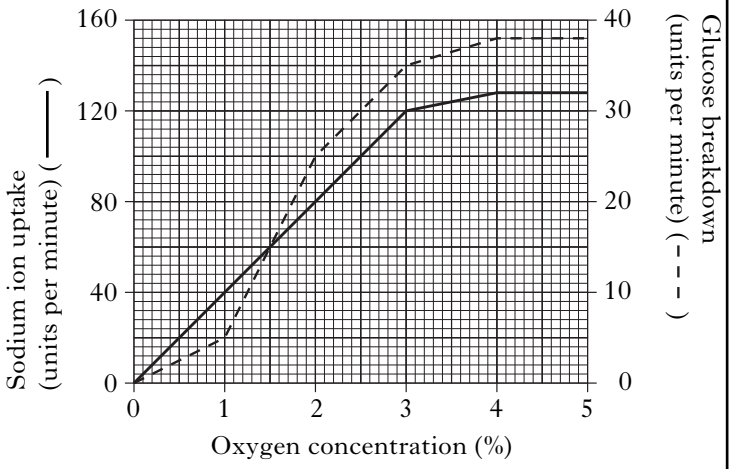
B carbohydrate

C lipid

D phospholipid.

[Turn over

7. An investigation was carried out into the uptake of sodium ions by animal cells. The graph shows the rates of sodium ion uptake and breakdown of glucose at different concentrations of oxygen.



Calculate the number of units of sodium ions that are taken up over a 5 minute period when the concentration of oxygen in solution is 2%.

A 80

B 100

C 400

D 500

8. Which of the following statements about viruses is true?

A Viral protein directs the synthesis of new viruses.

B New viruses are assembled outside the host cell.

C Viral protein is injected into the host cell.

D Viral DNA directs the synthesis of new viruses.

9. What is the significance of chiasma formation?

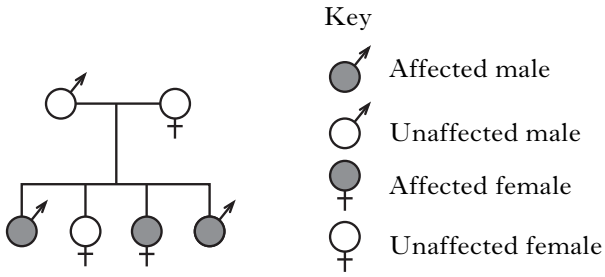
A It results in the halving of the chromosome number.

B It results in the pairing of homologous chromosomes.

C It permits gene exchange between homologous chromosomes.

D It results in the independent assortment of chromosomes.

10. The transmission of a gene for deafness is shown in the family tree below.



This condition is controlled by an allele which is

A dominant and sex-linked

B recessive and sex-linked

C dominant and not sex-linked

D recessive and not sex-linked.

11. The examination of a karyotype would **not** detect

A phenylketonuria

B Down's syndrome

C the sex of the fetus

D evidence of non-disjunction.

12. A woman with blood group *AB* has a child to a man with blood group *O*. What are the possible phenotypes of the child?

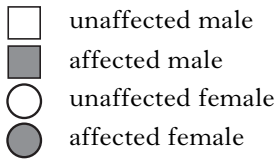
A *A* or *B*

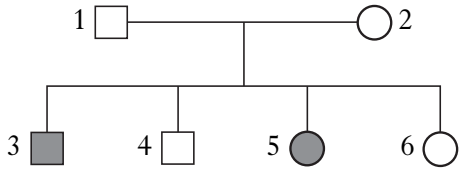
B *AB* only

C *AB* or *O*

D *AB*, *A* or *B*

13. Cystic fibrosis is an inherited condition caused by a recessive allele. The diagram below is a family tree showing affected individuals.





Which two individuals in this family tree must be heterozygous for the cystic fibrosis gene?

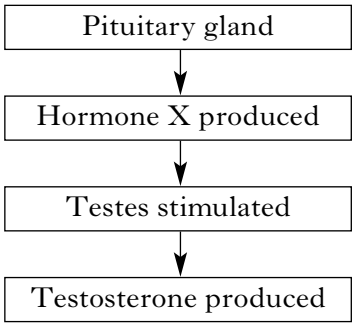
A 3 and 5

B 4 and 6

C 1 and 2

D 2 and 6

14. The diagram below shows the influence of the pituitary gland on testosterone production.



What is hormone X?

A Luteinising hormone

B Follicle stimulating hormone

C Oestrogen

D Progesterone

15. From which structure in the female reproductive system does a corpus luteum develop?

A Endometrium

B Graafian follicle

C Fertilised ovum

D Unfertilised ovum

16. The table below contains information about four semen samples.

	Semen sample			
	A	B	C	D
Number of sperm in sample (millions/cm^3)	40	30	20	60
Active sperm (percent)	50	60	75	40
Abnormal sperm (percent)	30	65	10	70

Which semen sample has the highest number of active sperm per cm^3?

17. Which of the following describes correctly the exchange of materials between maternal and fetal circulations?

	Glucose	*Antibodies*
A	into fetus by active transport	into fetus by active transport
B	into fetus by active transport	into fetus by pinocytosis
C	into fetus by pinocytosis	into fetus by active transport
D	into fetus by diffusion	into mother by pinocytosis

18. The diffusion pathway of carbon dioxide within body tissues is

A plasma → tissue fluid → cell cytoplasm

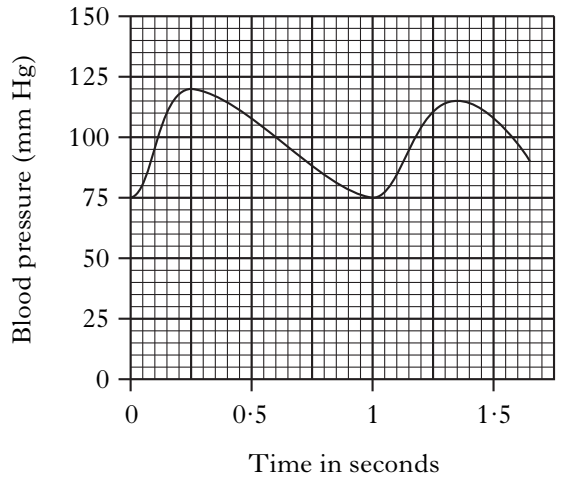
B lymph → tissue fluid → cell cytoplasm

C cell cytoplasm → tissue fluid → plasma

D tissue fluid → lymph → plasma.

[Turn over

19. The graph below shows changes in arterial blood pressure.



The shape of the graph is due to

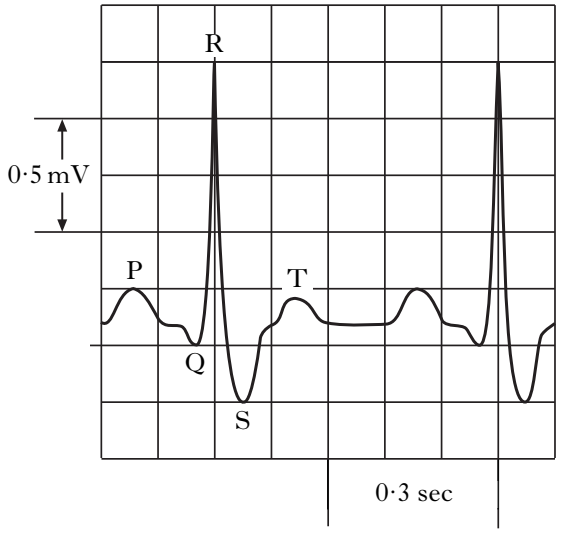
A the action of the heart muscle

B the action of the diaphragm

C the closing of the valves in the veins

D muscular contraction of the arteries.

20. An ECG trace is shown below.



What is the person's heart rate?

A 100 beats per minute

B 120 beats per minute

C 150 beats per minute

D 200 beats per minute

21. Which of the following statements refers correctly to the cardiac cycle?

A During systole the atria contract followed by the ventricles.

B During systole the ventricles contract followed by the atria.

C During diastole the atria contract followed by the ventricles.

D During diastole the ventricles contract followed by the atria.

22. Which line in the table below correctly describes the conditions under which the affinity of haemoglobin for oxygen is highest?

	Oxygen tension	*Temperature* (°C)
A	high	40
B	high	37
C	low	37
D	low	40

23. Which of the following is triggered by the hypothalamus in response to an increase in the temperature of the body?

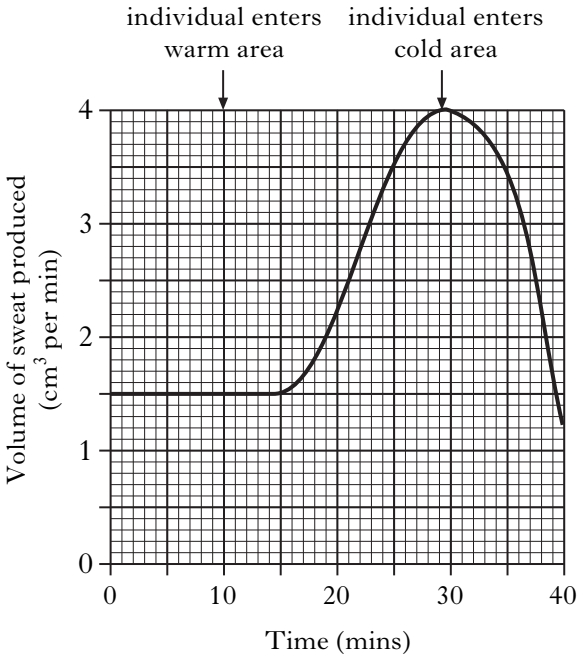
A Contraction of the hair erector muscles and vasodilation of the skin arterioles

B Contraction of the hair erector muscles and vasoconstriction of the skin arterioles

C Relaxation of the hair erector muscles and vasodilation of the skin arterioles

D Relaxation of the hair erector muscles and vasoconstriction of the skin arterioles

24. The graph below shows the rate of sweating of an individual in different environmental conditions.



How long after entering the warm area did it take for the volume of sweat production to increase by 100%?

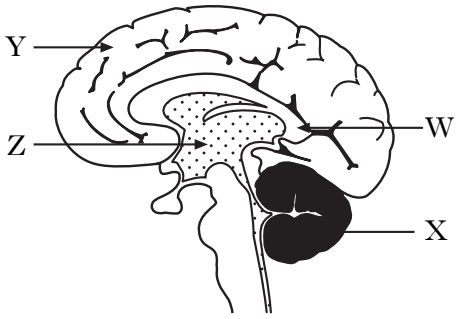
A 8 minutes

B 13 minutes

C 20 minutes

D 23 minutes

25. The diagram below shows the main parts of the brain as seen in vertical section.

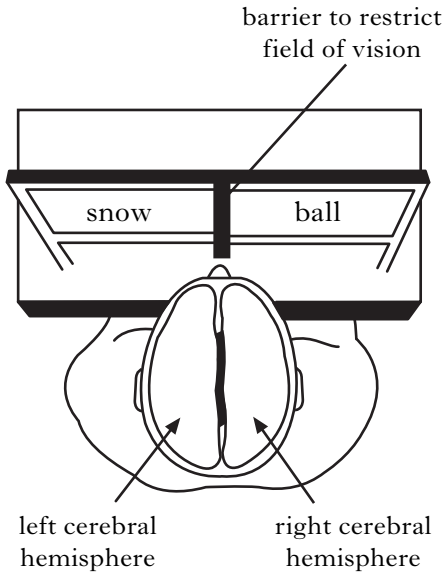


Which line in the table below correctly identifies the functions of two areas of the brain?

	Communication between hemispheres	*Reasoning*
A	W	X
B	X	Y
C	W	Y
D	Z	W

[Turn over

26. The diagram below shows a test on a man who had a damaged corpus callosum. This meant that he could no longer transfer information between his right and left cerebral hemispheres.



Some of the functions of each hemisphere are described in the table below.

Left cerebral hemisphere	*Right cerebral hemisphere*
processes information from right eye	processes information from left eye
controls language production	controls spatial task co-ordination

The man was asked to look straight ahead and then the words "snow" and "ball" were flashed briefly on the screen as shown.

What would the man say that he had just seen?

A Ball

B Snow

C Snowball

D Nothing

27. Which of the following statements about diverging neural pathways is correct?

A They accelerate the transmission of sensory impulses.

B They suppress the transmission of sensory impulses.

C They decrease the degree of fine motor control.

D They increase the degree of fine motor control.

28. Which of the following describes the change in an individual's behaviour where the presence of others causes the individual to show less restraint and become more impulsive?

A Social facilitation

B Shaping

C Generalisation

D Deindividuation

29. Which of the following identifies correctly a process in the nitrogen cycle?

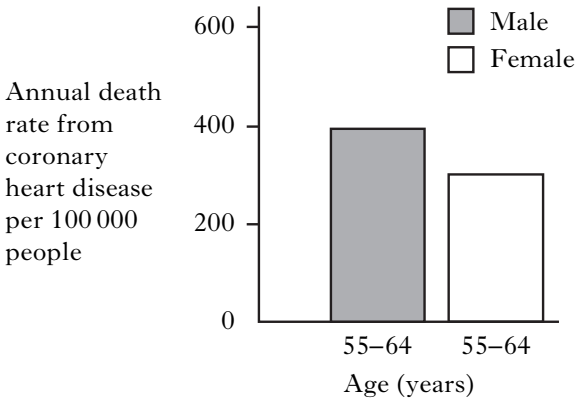
A Nitrifying bacteria trap atmospheric nitrogen.

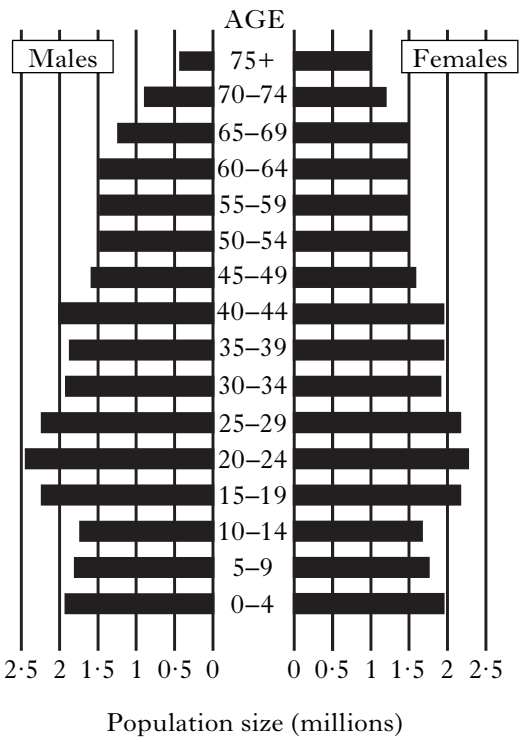
B Nitrifying bacteria convert ammonium compounds to nitrates.

C Nitrogen-fixing bacteria convert nitrates to atmospheric nitrogen.

D Denitrifying bacteria convert ammonia to nitrates.

30. The diagrams below contain information about the population of Britain.





How many British men between 55 and 64 years of age die from coronary heart disease annually?

A 400

B 6000

C 12 000

D 24 000

Candidates are reminded that the answer sheet MUST be returned INSIDE the front cover of this answer booklet.

[Turn over for Section B on *Page eleven*

[BLANK PAGE]

DO NOT WRITE IN THIS MARGIN

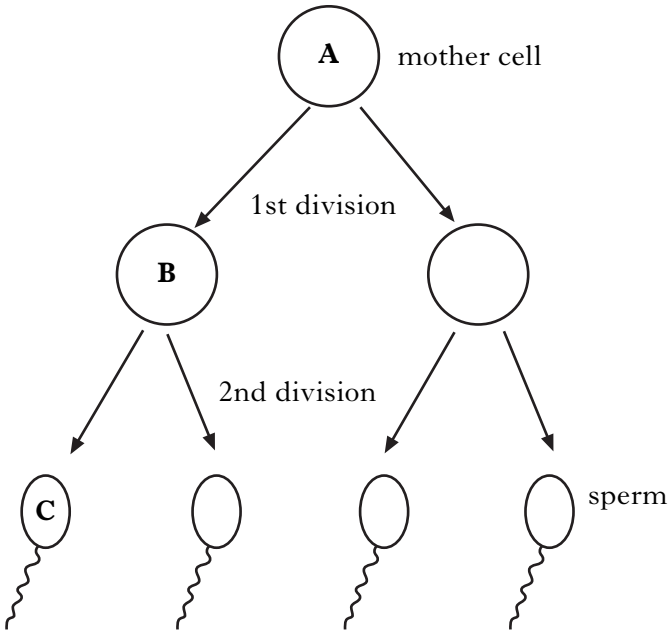
Marks

SECTION B

All questions in this section should be attempted.

All answers must be written clearly and legibly in ink.

1. The diagram below represents stages in the production of human sperm.



(*a*) Name the type of cell division that produces sex cells.

_____ **1**

(*b*) State the number of chromosomes which would be present in the cells labelled A, B and C.

A: _____ B: _____ C: _____ **1**

(*c*) Compare the appearance of the chromosomes in cell B and cell C.

_____

_____ **1**

(*d*) Name the **two** processes which increase variation during the 1st division of the sperm mother cell.

1 _____

2 _____ **1**

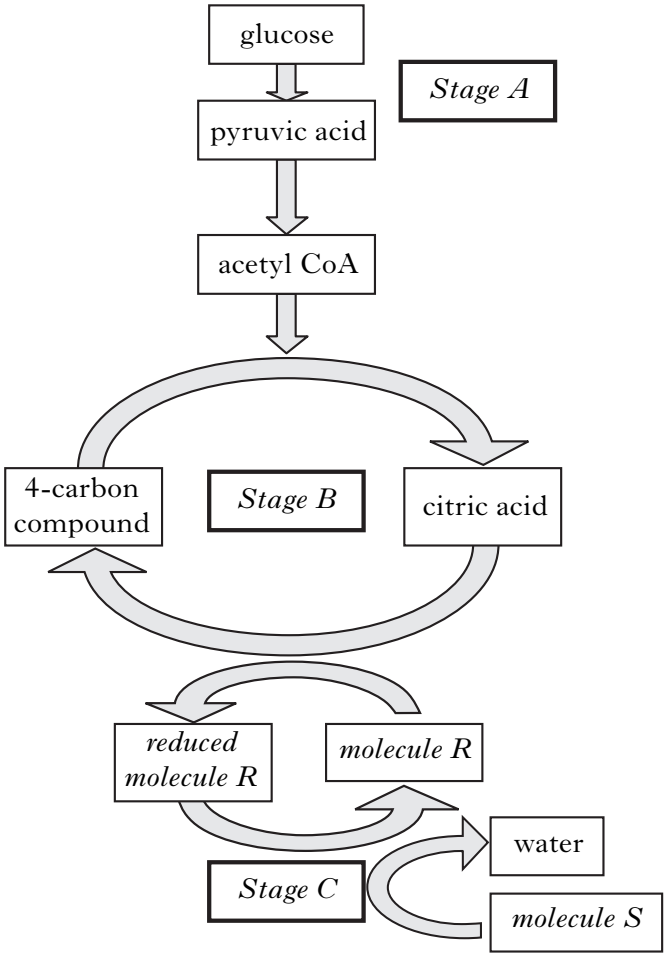
(*e*) State the location of sperm production in the testes.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

2. The diagram below shows some of the reactions which occur during aerobic respiration.



(*a*) Complete the table by naming stages A, B and C and indicating their **exact** location within the cell.

Stage	*Name*	*Location*
A		
B		
C		

3

(*b*) A glucose molecule contains 6 carbon atoms.

How many carbon atoms are found in the following molecules?

Pyruvic acid _____

Citric acid _____ **1**

Marks

2. (continued)

(*c*) Complete the following sentences by naming molecules R and S and describing their function with respect to stage C.

R is _____ and its function is _____

_____

_____ .

S is _____ and its function is _____

_____

_____ . **2**

(*d*) Under normal circumstances carbohydrate is the main respiratory substrate.

In each of the following extreme situations, state the alternative respiratory substrate and explain why the body has to use it.

Situation	*Respiratory substrate*	*Explanation*
Prolonged starvation		
Towards the end of a marathon race		

2

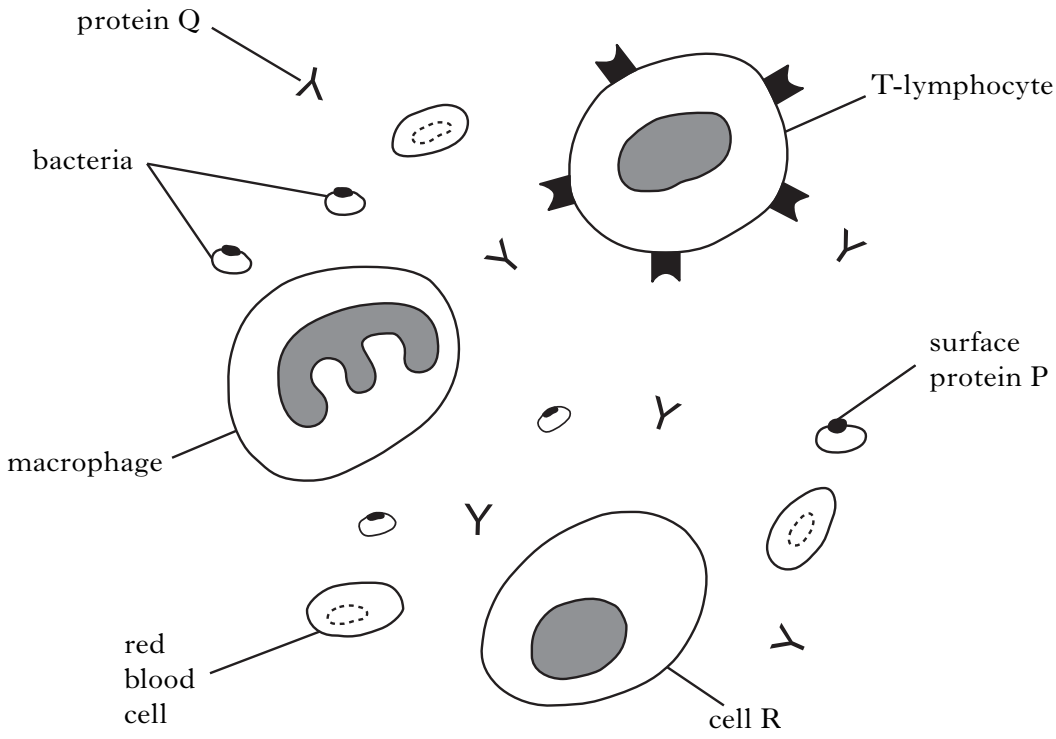
[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

3. The diagram below shows blood from a person who has been infected by bacteria. These bacteria have triggered an immune response involving proteins P and Q.

The diagram is not drawn to scale.



(*a*) (i) Identify proteins P and Q.

P _____ Q _____ **1**

(ii) Cell R produced protein Q.

Name this type of cell.

_____ **1**

(iii) Describe the role of the following cells in combating infection.

(A) T-lymphocyte _____

_____ **1**

(B) Macrophage _____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

3. (continued)

(*b*) Complete the following sentences by underlining one option from each pair of options shown in **bold**.

(i) Immunity gained after contracting a bacterial infection is an example of **active** / **passive** immunity that is **naturally** / **artificially** acquired. **1**

(ii) Immunity gained from the injection of a tetanus vaccine is an example of **active** / **passive** immunity that is **naturally** / **artificially** acquired. **1**

(*c*) What happens during an autoimmune response?

_____

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

4. Lactose is the main sugar found in milk.

Lactose is broken down by lactase, an enzyme which is made by cells lining the small intestine. The glucose and galactose molecules produced are then absorbed into the bloodstream.

$$\text{lactose} \xrightarrow{\text{lactase}} \text{glucose} + \text{galactose}$$

A student carried out an investigation to compare the lactose content of human milk and cow milk.

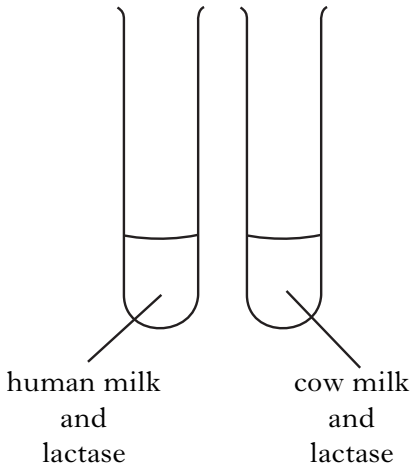
He set up a test tube containing human milk and lactase solution. Every 30 seconds samples were taken and the glucose concentration measured. Then he repeated the procedure with cow milk.

His experimental setup is shown in Figure 1.

His results are shown in the table below.

Time (min)	*Concentration of glucose* (%)	
	Human milk	*Cow milk*
0	0	0
0·5	0·28	0·28
1·0	0·54	0·46
1·5	0·80	0·54
2·0	1·04	0·58
2·5	1·10	0·58
3·0	1·10	0·58

Figure 1



(*a*) Lactose is a disaccharide sugar.

Explain how the information above supports this statement.

_____

_____ **1**

(*b*) One variable that must be kept constant in this investigation is pH.

List **two** other variables which would have to be kept constant.

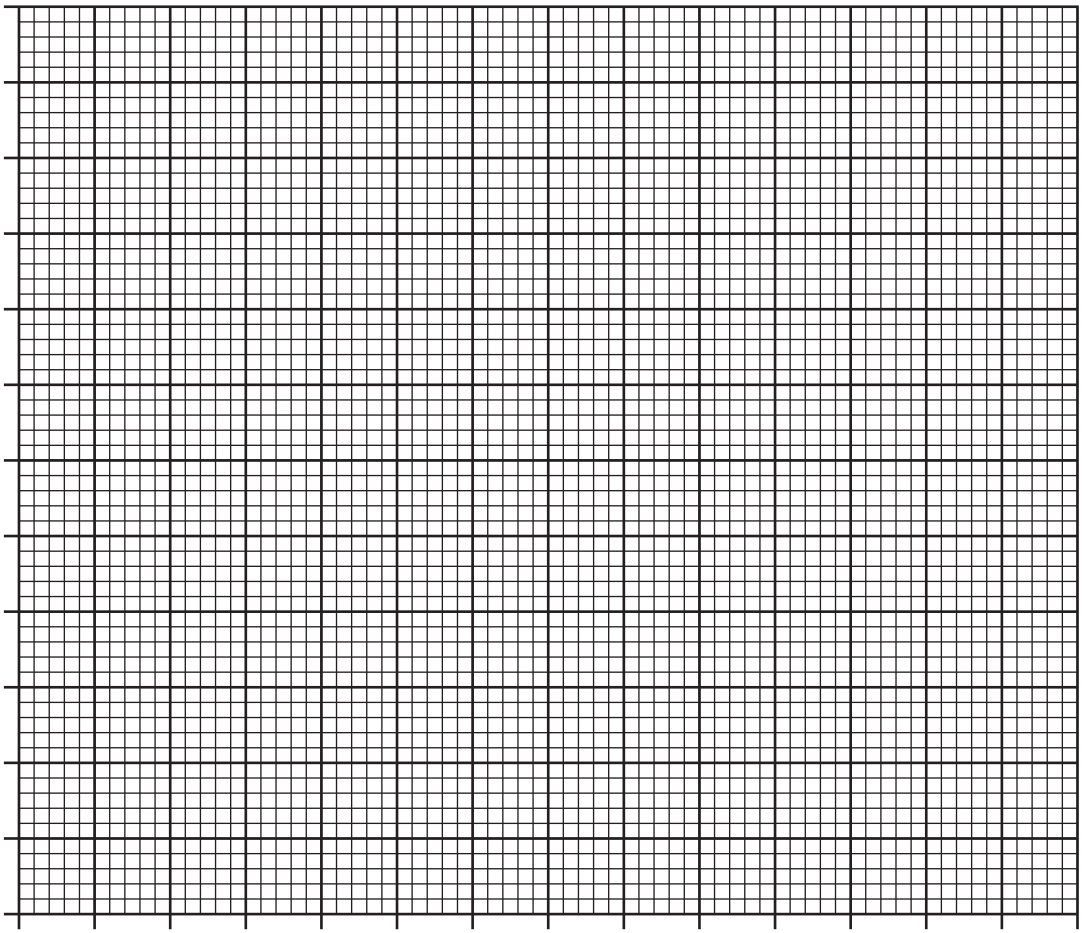
1 _____

2 _____ **1**

Marks

4. (continued)

(*c*) Construct a line graph to show all the data in the table.
(Additional graph paper, if required, can be found on *Page thirty-six*.)



3

(*d*) What conclusion can be drawn from this investigation?

_____

_____ **1**

(*e*) Suggest a reason why the rate of glucose production is not constant throughout the investigation.

_____

_____ **1**

(*f*) How could the student improve the reliability of his results?

_____

_____ **1**

Marks

4. (continued)

(*g*) Some people who have problems digesting lactose are said to be lactose intolerant.

They cannot produce the enzyme lactase.

(i) What general phrase describes an inherited disorder in which the absence of an enzyme prevents a chemical reaction from happening?

_____ **1**

(ii) A test can be carried out for lactose intolerance.

The individual being tested does not eat for twelve hours and then drinks a liquid that contains lactose. The individual rests for the next two hours during which their blood glucose level is measured at regular intervals.

What results would be expected if the individual is lactose intolerant?

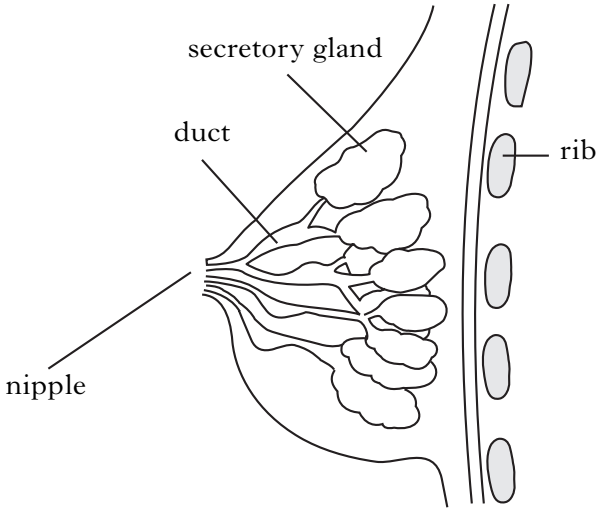
_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

5. The diagram below shows a section of a woman's breast shortly after she has given birth.



(*a*) (i) Name the hormone that stimulates the secretory glands to start producing milk.

_____ **1**

(ii) The cells lining the secretory glands are particularly rich in ribosomes. Suggest a reason for this.

_____

_____ **1**

(*b*) Fluid is not usually released from the breast until the baby suckles.

(i) What name is given to the first fluid that the baby receives from the breast?

_____ **1**

(ii) Describe **one** way in which this first fluid differs from the breast milk produced a few days later.

_____

_____ **1**

(iii) Suckling and crying are examples of non-verbal communication used by a baby. Why is non-verbal communication important to **both** the mother and baby?

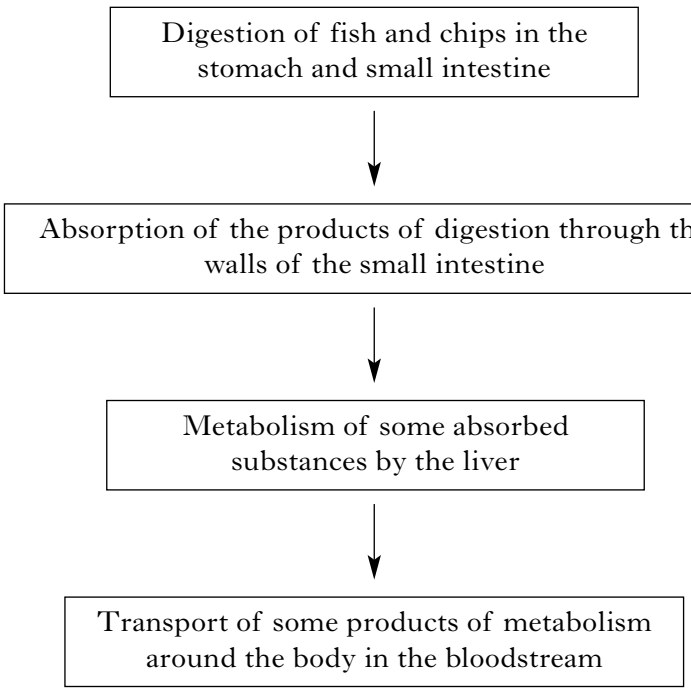
_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

6. The flow diagram below summarises what happens in the body after a meal of fish and chips.



(*a*) Explain how bile salts aid the digestion of the fish and chips.

1

(*b*) The products of fat digestion are fatty acids and glycerol.

Describe the route taken by these products as they move from the small intestine to the bloodstream.

2

DO NOT WRITE IN THIS MARGIN

Marks

6. (continued)

(*c*) During the absorption and metabolism of this meal, samples of blood from the hepatic portal vein and the hepatic vein were tested for glucose and urea.

Complete each row of the table below, using the words **Higher** and **Lower**, to compare the concentration of each substance in the two blood vessels.

	Blood vessel	
Substance	Hepatic portal vein	Hepatic vein
Glucose		
Urea		

2

(*d*) State **one** feature of veins which helps to maintain blood flow.

_____

_____ **1**

(*e*) Drugs and alcohol pass into the bloodstream through the digestive system.

The liver converts these harmful substances into harmless products.

What term describes this action of the liver?

_____ **1**

[Turn over

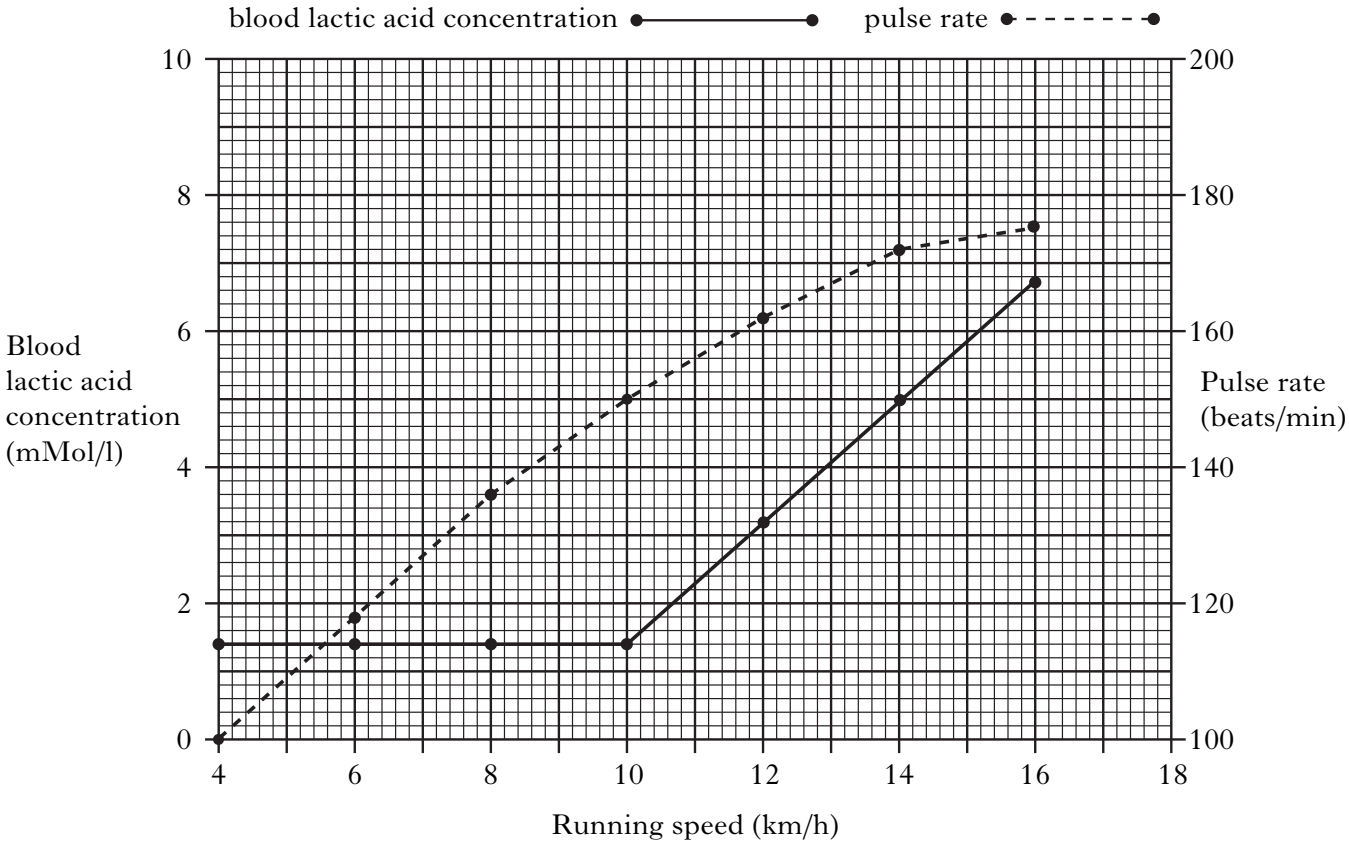
DO NOT WRITE IN THIS MARGIN

Marks

7. A long distance runner took part in some laboratory tests using a treadmill.

She was asked to use the treadmill at a setting of 4 km/h for three minutes during which her pulse rate was monitored. At the end of this time a blood sample was taken which was tested for lactic acid concentration. The procedure was then repeated a number of times at faster speeds.

The results of the tests are shown in the graph below.



(*a*) (i) What was the runner's pulse rate when she was running at 6 km/h?

_____ **1**

(ii) State the concentration of lactic acid in the runner's blood when her pulse rate was 172 beats/min.

_____ mMol/l **1**

(iii) Predict what the runner's blood lactic acid concentration would be if she ran at 18 km/h for three minutes.

Blood lactic acid concentration _____ mMol/l **1**

DO NOT WRITE IN THIS MARGIN

Marks

7. (continued)

(*b*) A build-up of lactic acid in muscles leads to fatigue.

(i) Explain why lactic acid builds up in the muscles as running speeds increase.

_____

_____

_____

_____ **2**

(ii) Distance runners often monitor their pulse rate while they are training.

Suggest how this runner could use a pulse rate monitor and the information from the graph to allow her to run for long periods of time without developing muscle fatigue.

_____

_____

_____

_____ **2**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

8. Two men (P and R) were being tested for *diabetes mellitus*, a condition which results in failure to control blood glucose concentration.

After fasting overnight, they were given a large glucose drink. Their blood glucose concentration was measured immediately (0 hours) and then every hour for five hours.

The results of the tests are shown in the table below.

	Time after drinking glucose (hours)					
	0	*1*	*2*	*3*	*4*	*5*
Blood glucose concentration of P (mg/100 ml)	145	210	190	180	170	160
Blood glucose concentration of R (mg/100 ml)	90	125	90	85	90	90

(*a*) It was concluded that P had diabetes and R did not.

(i) State **two** ways in which the test results indicate that P has diabetes.

1 _____

2 _____ **1**

(ii) Name the hormone responsible for the change in the blood glucose concentration of R

(A) between 1 and 2 hours _____

(B) between 3 and 4 hours. _____ **1**

(*b*) *Diabetes insipidus* can be caused by a lack of ADH in the body.

(i) Which organ of the body releases ADH?

_____ **1**

(ii) State an effect that failure to produce ADH would have on the body.

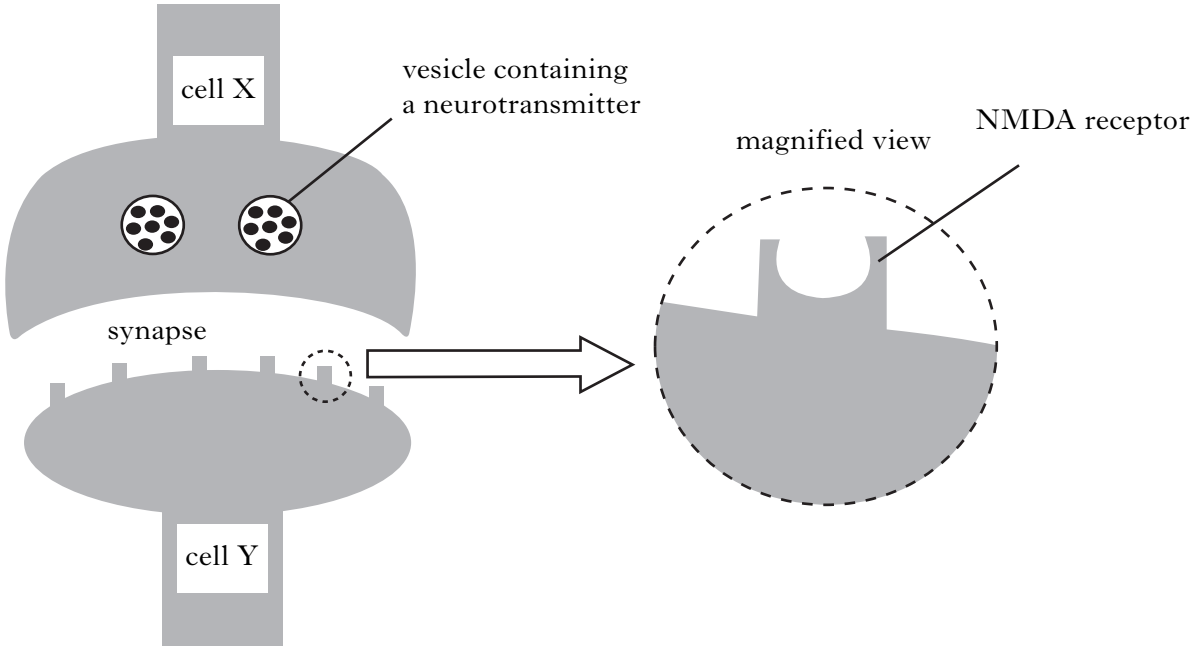
_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

9. The diagram below shows a synapse between two nerve cells in the brain and a magnified view of a receptor called NMDA.



(*a*) (i) Describe how the neurotransmitter in the vesicle reaches cell Y.

_____

_____

_____ **2**

(ii) The diagram above shows a single neural pathway.

Explain how a converging neural pathway would be more likely to generate an impulse in nerve cell Y.

_____

_____

_____ **2**

(*b*) Many factors can lead to memory loss.

(i) One of these factors is a reduction in the number of NMDA receptors.

Which part of the brain contains nerve cells rich in NMDA receptors?

_____ **1**

(ii) Another factor is the decreased production of acetylcholine.

Name the condition which results from the loss of acetylcholine-producing cells in the brain.

_____ **1**

DO NOT WRITE IN THIS MARGIN

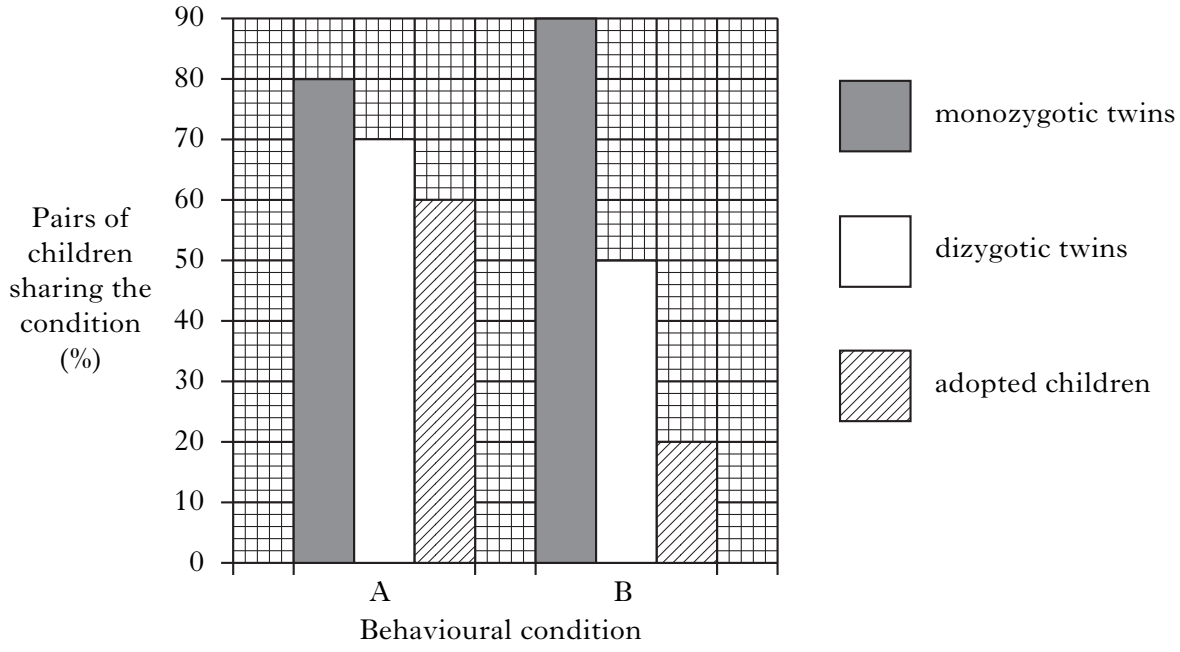
Marks

10. A study was carried out to compare the influence of genetics with that of the environment on the development of two behavioural conditions, A and B.

Several hundred pairs of children, from the same families, took part in the study. Some pairs were monozygotic twins, some pairs were dizygotic twins and some pairs were adopted and unrelated.

In each pair, one of the children had one of the behavioural conditions and investigators observed whether or not the other child shared the condition.

Results of the study are shown in the bar graph below.



(*a*) Explain why it was important that monozygotic twins were chosen for this study.

_____

_____

_____ **2**

(*b*) Use the graph to explain whether conditions A and B are more likely to be caused by genetic or environmental factors.

(i) Likely cause of condition A _____

Explanation _____

_____ **1**

(ii) Likely cause of condition B _____

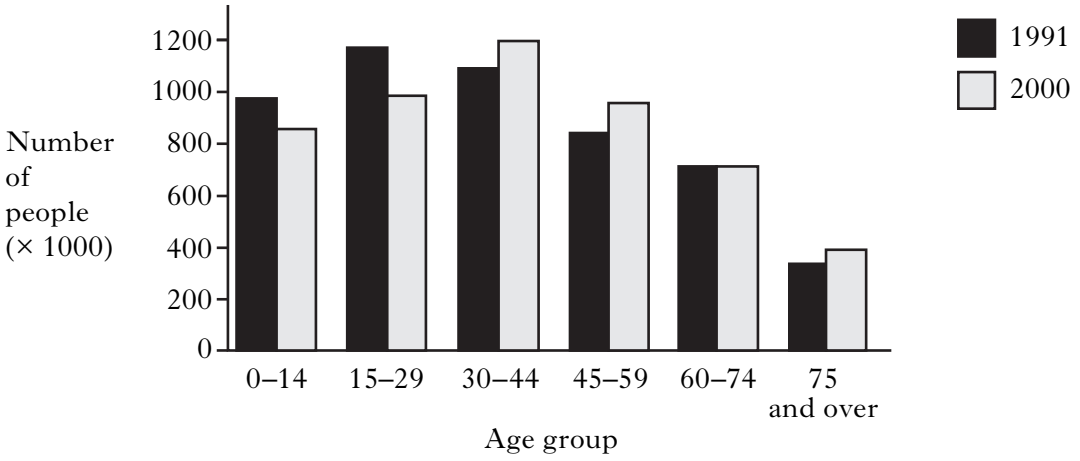
Explanation _____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

11. The bar graph shows population changes in Scotland for different age groups between 1991 and 2000.



(*a*) Suggest a reason for the population change in those aged 75 and over.

_____

_____ **1**

(*b*) Describe **two** ways in which the data for the year 2000 would be different if it were taken from a developing country with a similar population size to Scotland.

1 _____

_____

2 _____

_____ **1**

(*c*) Describe **two** ways in which the information in the graph could be used by authorities to plan for the future.

1 _____

_____

2 _____

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

12. An investigation was carried out into the influence of adults on the behaviour of young children.

Some groups of children watched a recording of either a man or a woman being physically and verbally aggressive to a large plastic clown.

Other groups of children watched either a man or a woman behaving in a non-aggressive manner towards the clown.

Each child was then placed in a room on their own with the clown. The number of aggressive acts they committed over a five minute period was counted.

The figures in the table below show the average number of aggressive acts that the children committed while in the room.

	Average number of aggressive acts committed by the children			
Gender of children	*Aggressive man observed*	*Aggressive woman observed*	*Non-aggressive man observed*	*Non-aggressive woman observed*
Boys	18·7	7·9	1·0	0·6
Girls	4·4	9·2	0·2	0·8

(*a*) (i) Which adult/child combination resulted in the least aggression?

_____ **1**

(ii) Calculate the percentage increase in aggressive acts committed by boys when they observe an aggressive man rather than a non-aggressive man.

Space for calculation

_____ % **1**

(iii) State a conclusion that can be drawn from these results regarding the gender of the aggressive adult.

_____

_____ **1**

(*b*) The children are observing and then repeating the acts of adults. What form of learning are they using?

_____ **1**

(*c*) Suggest a control that could have also been used in this investigation.

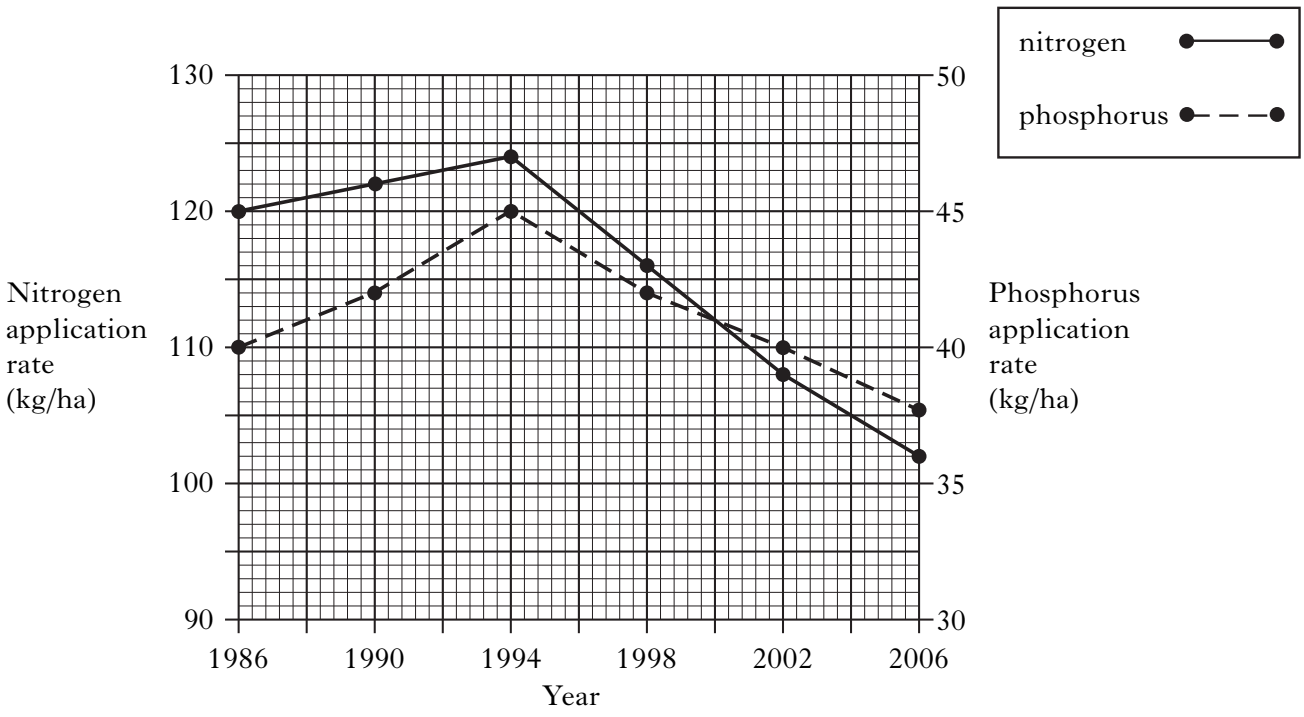
_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

13. The graph below shows the application rates of nitrogen and phosphorus to crops in an area of Scotland between 1986 and 2006.

Marks



(*a*) Describe **one** similarity and **one** difference in the data for nitrogen and phosphorus application rate between 1986 and 2006.

Similarity _____

_____

Difference _____

_____ **2**

(*b*) Express, as a simple whole number ratio, the application rate of nitrogen compared to phosphorus in 1986.

Space for calculation

_____ : _____ **1**
nitrogen phosphorus

(*c*) In recent years, there has been a decrease in the use of nitrogen and phosphorus on farms in Scotland.

(i) Suggest **one** way in which this decrease might benefit the environment.

_____

_____ **1**

(ii) Suggest **one** way in which this decrease might disadvantage farmers.

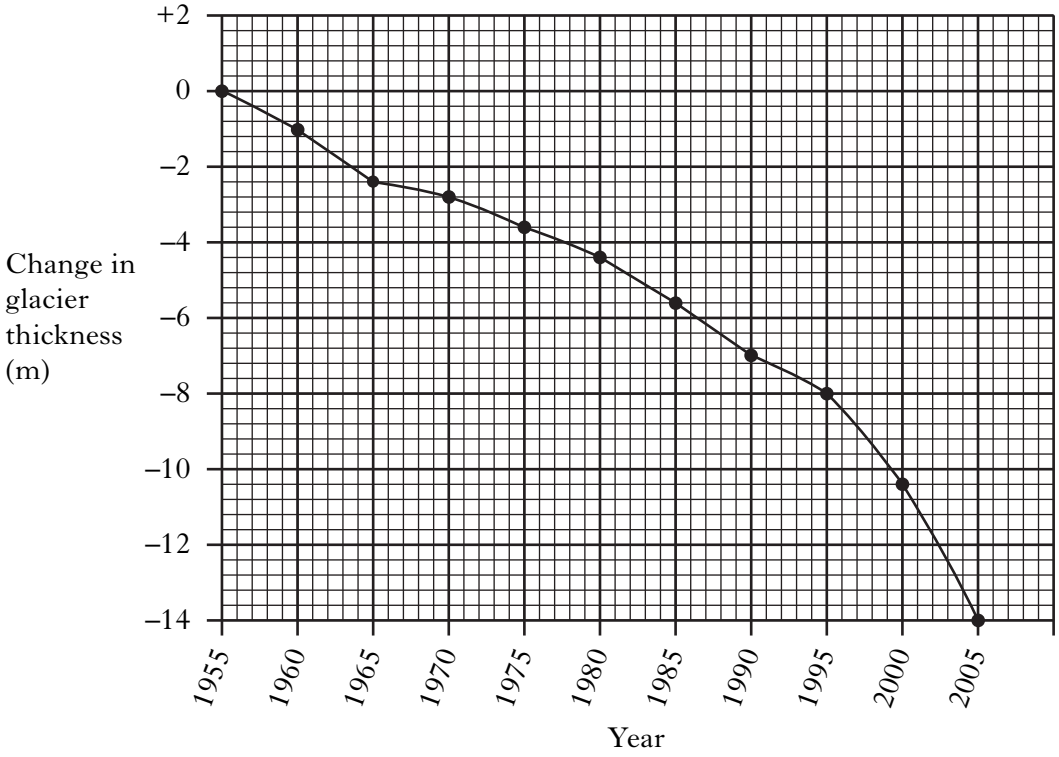
_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

14. Glaciers are large masses of ice on mountains and in cold regions of the world. The graph below shows the average change in glacier thickness around the world between 1955 and 2005.



(*a*) (i) Calculate the average yearly decrease in glacier thickness between 1955 and 2005.

Space for calculation

_____ m/year **1**

(ii) One consequence of this decrease in glacier thickness is rising sea levels. Describe **one** effect of rising sea levels and subsequent flooding on coastal communities around the world.

_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

14. (continued)

(*b*) Many people believe that the change in glacier thickness is caused by global warming.

(i) Name **two** gases that contribute to global warming.

1 _____ 2 _____ **1**

(ii) Give **two** reasons why one of these gases is increasing in the atmosphere.

Gas _____

Reason 1 _____

_____

Reason 2 _____

_____ **1**

[Turn over for Section C on *Page thirty-two*

DO NOT WRITE IN THIS MARGIN

Marks

SECTION C

Both questions in this section should be attempted.

Note that each question contains a choice.

Questions 1 and 2 should be attempted on the blank pages which follow.

Supplementary sheets, if required, may be obtained from the Invigilator.

Labelled diagrams may be used where appropriate.

1. Answer **either** A **or** B.

A. Discuss memory under the following headings:

(i) short-term memory; **5**

(ii) the transfer of information between short and long-term memory. **5**

(10)

OR

B. Discuss how man has attempted to increase food supply under the following headings:

(i) chemical use; **4**

(ii) genetic improvement; **3**

(iii) land use. **3**

(10)

In question 2, ONE mark is available for coherence and ONE mark is available for relevance.

2. Answer **either** A **or** B.

A. Discuss the biological basis of contraception. **(10)**

OR

B. Discuss the conducting system of the heart and how it is controlled. **(10)**

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

SPACE FOR ANSWERS

SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 4(*c*)