

FOR OFFICIAL USE

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Total for
Sections B & C

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X009/12/02

NATIONAL
QUALIFICATIONS
2015

WEDNESDAY, 13 MAY
1.00 PM – 3.30 PM

HUMAN BIOLOGY
HIGHER

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

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Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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SECTION A—Questions 1–30 (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)

- (a) All questions should be attempted.
(b) It should be noted that in **Section C** questions 1 and 2 each contain a choice.
- 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**.
- 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.
- The numbers of questions must be clearly inserted with any answers written in the additional space.
- 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.
- 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**.

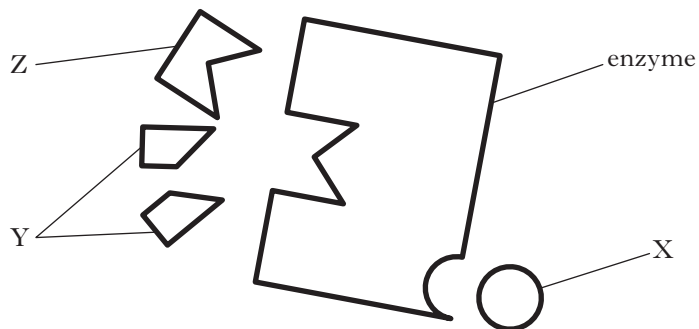


SECTION A

All questions in this section should be attempted.

Answers should be given on the separate answer sheet provided.

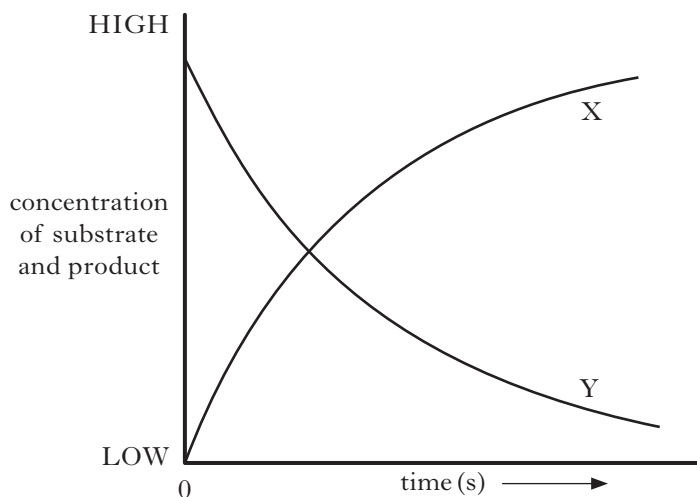
1. The diagram below represents various molecules involved in a synthesis reaction.



Which line in the table below correctly identifies the molecules?

	X	Y	Z
A	competitive inhibitor	substrate	product
B	competitive inhibitor	product	substrate
C	non-competitive inhibitor	substrate	product
D	non-competitive inhibitor	product	substrate

2. The graph below shows the changes to the concentrations of substrate and product during an enzyme-controlled reaction.

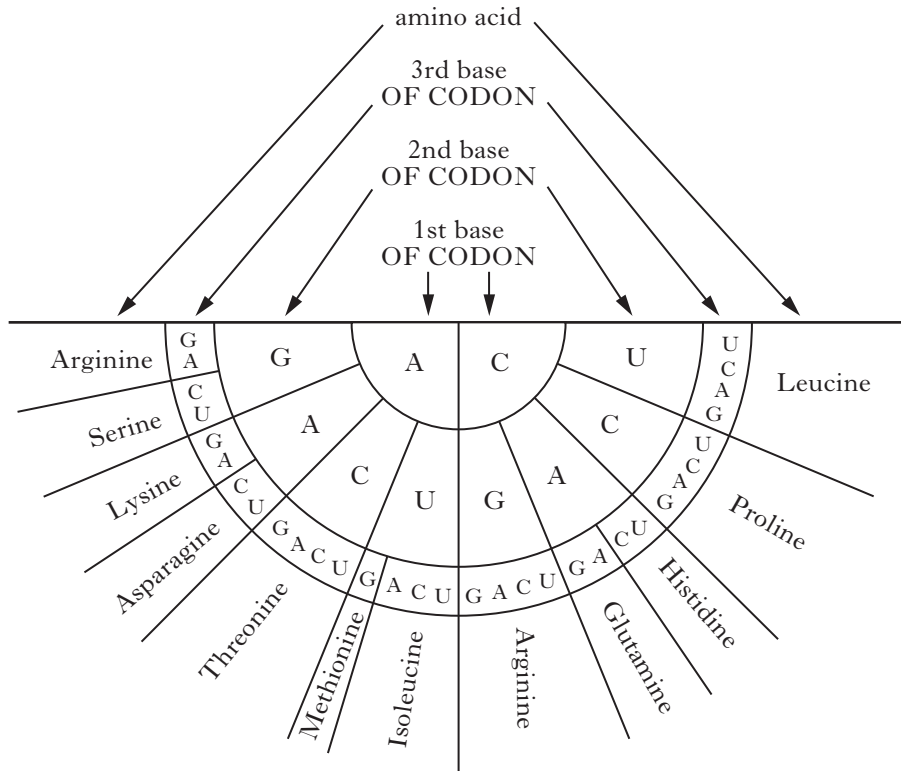


Which line in the table below correctly identifies the substrate, product and the change in the rate of the reaction during the process?

	Substrate	Product	Rate of reaction
A	X	Y	increasing
B	X	Y	decreasing
C	Y	X	increasing
D	Y	X	decreasing

[Turn over

3. The diagram below can be used to identify amino acids coded for by mRNA codons.



How many different amino acids are coded for by the following mRNA strand?

A U G C C A A C U C C U A G A C G A A U A

- A 4
- B 5
- C 6
- D 7

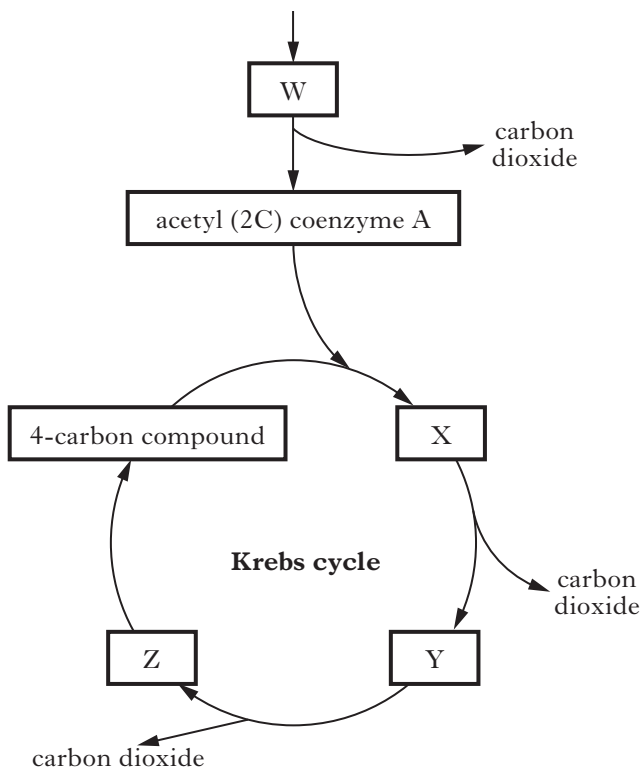
4. Which of the following is a possible anti-codon found on a tRNA molecule?

- A GGG
- B TTT
- C ATC
- D GTU

5. Which of the following substances must be present in a living cell for glycolysis to occur?

- A Glucose and ATP
- B ATP and oxygen
- C Glucose and oxygen
- D ATP and pyruvic acid

6. The diagram below illustrates some stages during respiration.



Which line in the table below correctly identifies the number of carbon atoms in compounds W, X, Y and Z?

	Number of carbon atoms			
	W	X	Y	Z
A	6	6	5	4
B	3	4	3	2
C	3	6	5	4
D	6	4	3	2

7. The following substances are products of respiration.

- 1 ATP
- 2 Lactic acid
- 3 Carbon dioxide

Which of these substances are products of anaerobic respiration in human muscle tissue?

- A 2 only
- B 1 and 2 only
- C 2 and 3 only
- D 1, 2 and 3

8. A cell actively absorbs potassium ions at a rate of 200 per second and actively removes sodium ions at a rate of 300 per second. Potassium ions diffuse out of the cell at a rate of 50 per second while sodium ions diffuse into the cell at a rate of 100 per second.

If the cell originally contained 30 000 potassium ions and 30 000 sodium ions, which line in the table below correctly shows the number of each type of ion that would be inside the cell after one minute of active transport and diffusion?

	Number of ions inside cell after one minute	
	potassium	sodium
A	18 000	39 000
B	30 150	29 800
C	39 000	18 000
D	45 000	6 000

9. Which of the following is **not** a role of lipids in the body?

- A Emulsification of fat
- B Insulation of nerves
- C Transport of vitamins
- D Storage of energy

[Turn over

10. Alleles are said to be co-dominant if
- A phenotypes of heterozygotes show the effect of both alleles equally
 - B genotypes of heterozygotes contain only one type of allele
 - C phenotypes of homozygotes are all identical
 - D genotypes of homozygotes contain different types of alleles.

11. The table below shows some genotypes and phenotypes associated with forms of sickle-cell anaemia.

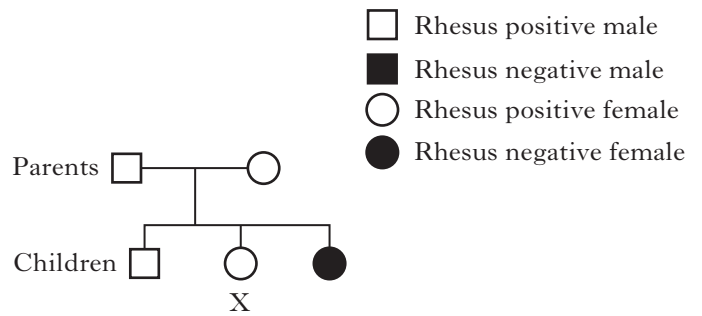
<i>Genotype</i>	<i>Phenotype</i>
AA	unaffected
AS	sickle-cell trait
SS	acute sickle-cell anaemia

A woman with sickle-cell trait and an unaffected man have a child together.

What are the chances that their child will have acute sickle-cell anaemia?

- A None
- B 1 in 1
- C 1 in 2
- D 1 in 4

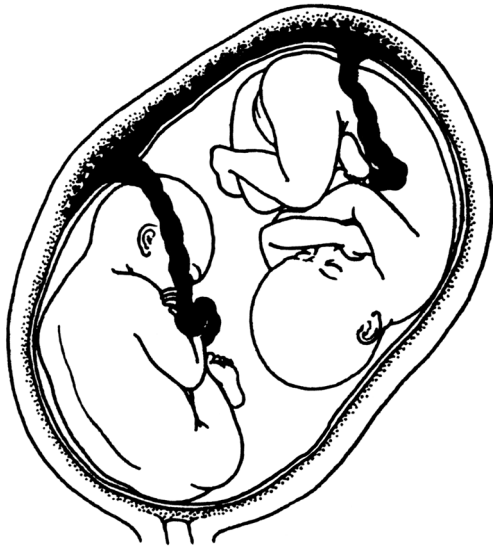
12. The family tree below shows the transmission of the Rhesus D-antigen. The gene for the Rhesus D-antigen is not sex-linked.



The chance of daughter X being heterozygous is

- A 0%
 - B 25%
 - C 50%
 - D 100%.
13. Polygenic inheritance is defined as inheritance where
- A more than one gene affects a characteristic
 - B many genes are found on one chromosome
 - C one gene influences many characteristics
 - D one gene has more than two alleles.
14. Which of the following will trigger the development of active immunity in the body?
- A Transfer of antibodies across the placenta.
 - B Injection of antitoxin into the body.
 - C Suckling of breast milk by a baby.
 - D Invasion by viruses during an infection.
15. Lysosomes are involved in the defence of the body as they
- A carry out phagocytosis to engulf bacteria
 - B produce antibodies to destroy viruses
 - C contain lymphocytes to destroy viruses
 - D allow phagocytes to digest bacteria.

16. The diagram below shows twins in a uterus.



Which line in the table below correctly describes the twins shown?

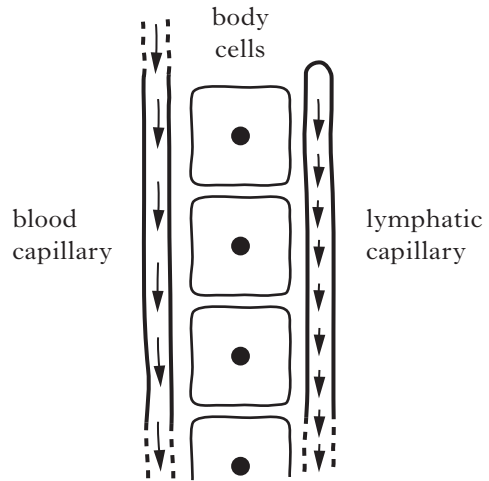
Description of twins			
A	monozygotic	genetically identical	always same sex
B	monozygotic	genetically different	may be different sex
C	dizygotic	genetically identical	always same sex
D	dizygotic	genetically different	may be different sex

17. A 40 g serving of a breakfast cereal contains 2 mg of iron. Only 25% of this iron is absorbed into the bloodstream.

If a pregnant woman requires a daily uptake of 6 mg of iron, how much cereal would she have to eat each day to meet this requirement?

- A 60 g
- B 120 g
- C 240 g
- D 480 g

18. The diagram below represents the relative position of blood capillaries, body cells and lymphatic capillaries.

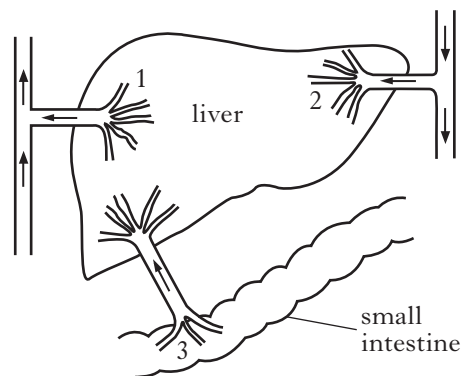


Which of the following is a correct description of the movement of oxygen?

- A Oxygen diffuses from body cells to blood and lymphatic capillaries.
- B Oxygen diffuses from blood capillaries to body cells.
- C Oxygen diffuses from lymphatic capillaries to body cells.
- D Oxygen diffuses from blood and lymphatic capillaries to body cells.

19. The diagram below shows the liver and its associated blood vessels.

The arrows show the direction of blood flow.



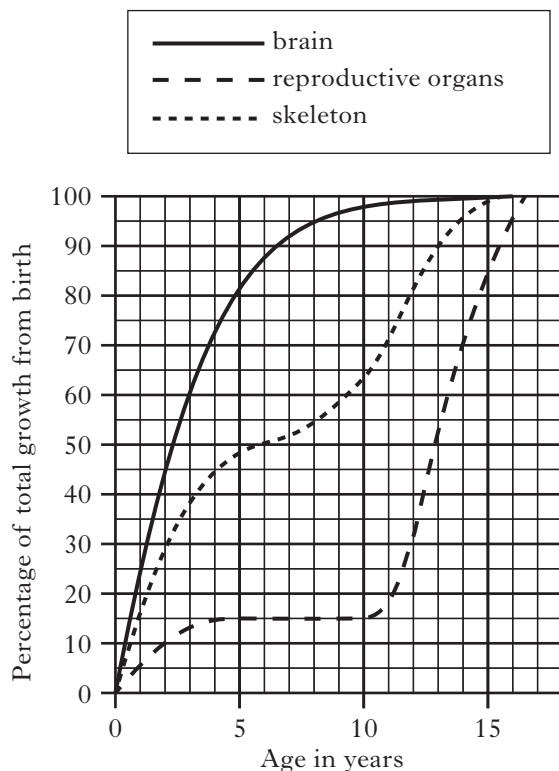
Which of the numbered regions show venules?

- A 1 only
- B 2 only
- C 1 and 3 only
- D 1, 2 and 3

20. Which line in the table below correctly identifies breakdown products of haemoglobin and amino acids in the liver?

	<i>Breakdown product of haemoglobin</i>	<i>Breakdown product of amino acids</i>
A	bilirubin	urea
B	bile	urea
C	bilirubin	urine
D	bile	urine

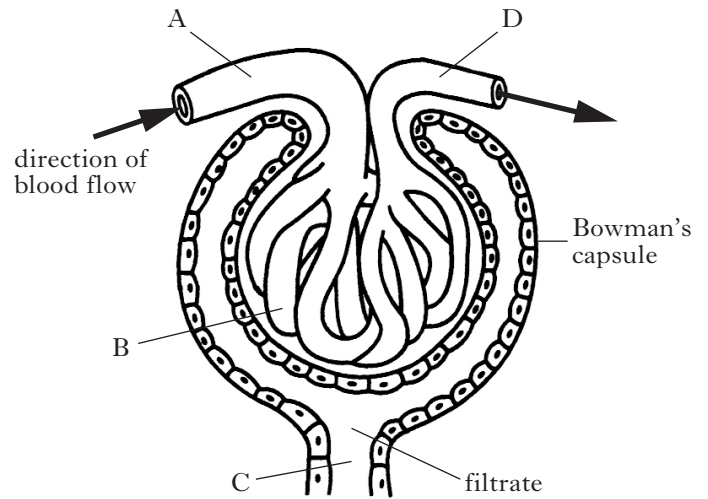
21. The graph below shows the average growth rate of body organs in males.



What is the ratio of total growth of brain to skeleton in an 8 year old child?

- A 3:11
- B 11: 3
- C 11:19
- D 19:11

22. The diagram below shows the structures involved in ultrafiltration of blood in the kidney.



Identify the area in which the concentration of protein will be highest.

23. Which of the following best describes the influence of maturation on behaviour?

- A Behaviour which is like that of an adult but can be learned at an early age.
- B Behaviour which results from practice and imitation rather than from trial and error learning.
- C Behaviour which results from infant attachment at an early stage of development.
- D Behaviour which occurs as a consequence of the development of the nervous system.

24. The following is a list of conditions which affect humans.

- 1 PKU
- 2 Measles
- 3 Huntington's chorea
- 4 Tetanus

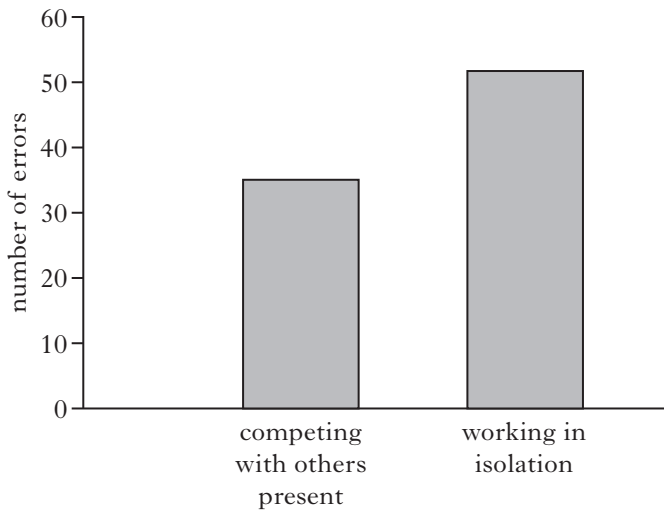
Which **two** of these conditions are inherited and affect the development of the nervous system?

- A 1 and 2 only
- B 1 and 3 only
- C 2 and 3 only
- D 2 and 4 only

25. Identical twins are valuable in the study of behaviour because
- A genetic factors can be discounted
 - B environmental factors can be discounted
 - C genetic and environmental factors can be discounted
 - D genetic, maturation and environmental factors can be discounted.

26. A number of students were trained to carry out a complex task. Some competed with one another, others worked in isolation.

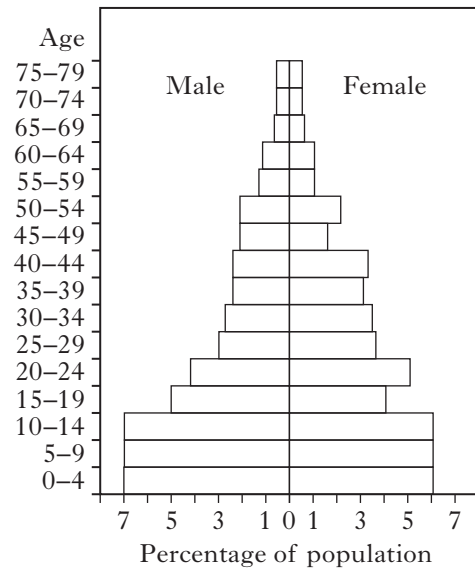
The graph below shows the number of errors recorded in the training process.



Which process is likely to have caused the difference in the results?

- A Deindividuation
 - B Social facilitation
 - C Shaping
 - D Internalisation
27. Which of the following terms describes the processes by which a person learns to distinguish between different but related stimuli?
- A Generalisation
 - B Imitation
 - C Discrimination
 - D Identification

28. The diagram below shows a population pyramid.

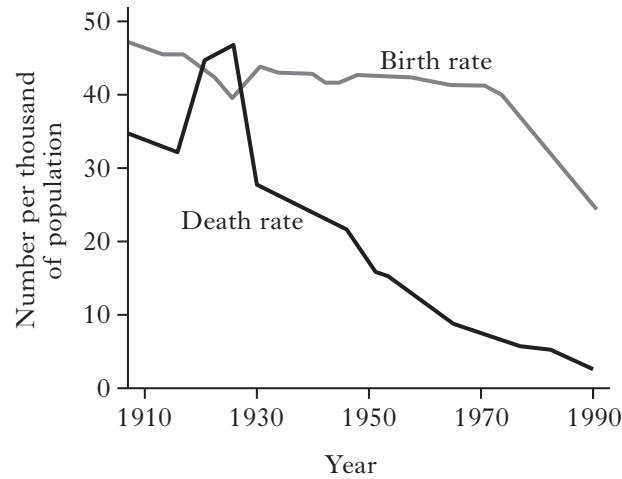


What percentage of the population is represented by girls under 20 years of age?

- A 4%
- B 22%
- C 26%
- D 48%

[Turn over

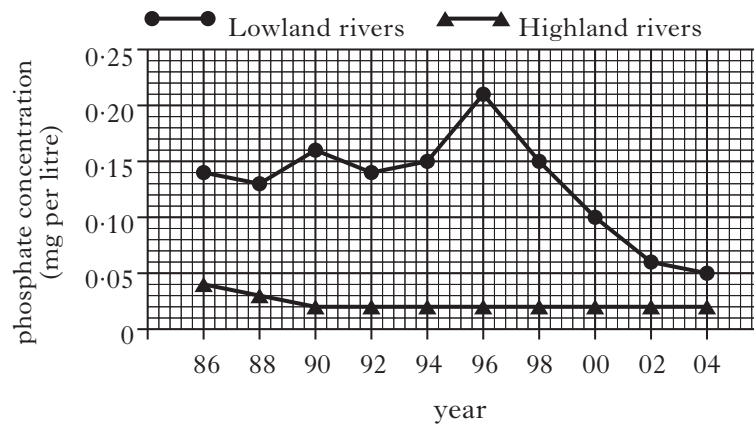
29. The graph below contains information about the birth rate and death rate in Mexico in the 20th century.



Which of the following conclusions can be drawn from the graph?

- A At no time during the century has the population of Mexico decreased.
- B The population was growing faster in 1910 than in 1990.
- C The greatest increase in population occurred in 1970.
- D Birth rate decreased between 1970 and 1990 due to the use of contraception.

30. The graph below shows phosphate concentrations in water from Scottish rivers between 1986 and 2004.



By how much did the phosphate concentration of the Lowland rivers decrease between 1988 and 2001?

- A 0.01 mg per litre
- B 0.05 mg per litre
- C 0.11 mg per litre
- D 0.50 mg per litre

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

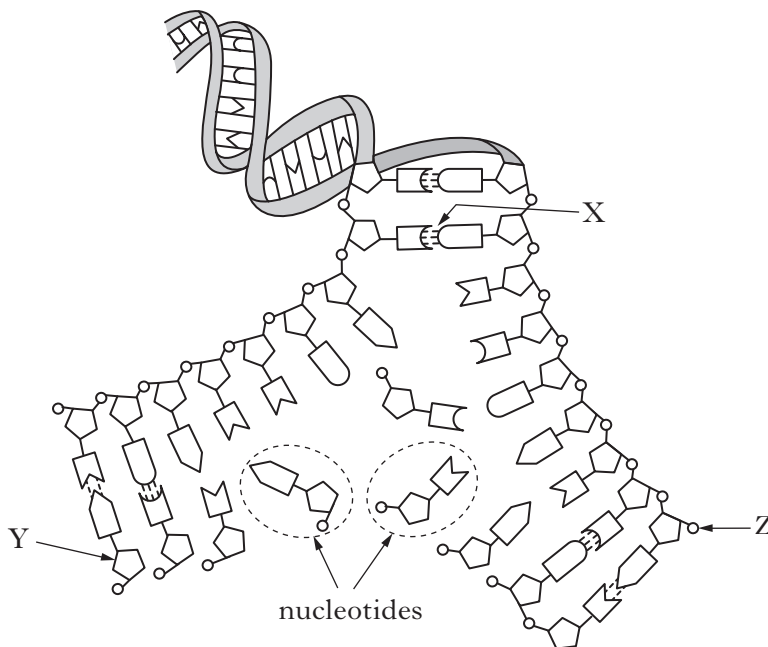
SECTION B

Marks

All questions in this section should be attempted.

All answers must be written clearly and legibly in ink.

1. The diagram below shows part of a DNA molecule during replication.



(a) (i) During replication, bonds between the two DNA strands are broken. Name the type of bond labelled X.

1

(ii) Identify the molecules labelled Y and Z.

Y _____ Z _____

1

(iii) Name **two** molecules **not shown on the diagram** which are essential for DNA replication.

1 _____ 2 _____

1

(b) Explain why DNA replication must take place before a cell divides.

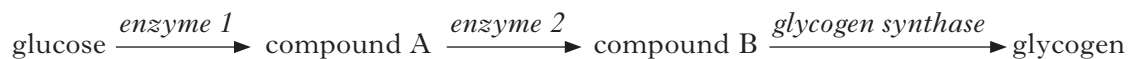
1

[Turn over

Marks

2. Glycogen storage disease is an inherited condition in which the enzyme glycogen synthase does not function.

This enzyme normally catalyses one step in the conversion of glucose to glycogen, as shown in the diagram below.



- (a) State the term which describes an inherited condition such as glycogen storage disease.

1

- (b) (i) Describe how the genetic code for glycogen synthase might be altered in an individual with the disease.

1

- (ii) Explain why this altered genetic code fails to produce glycogen synthase.

1

- (c) Suggest why individuals with glycogen storage disease might develop abnormally low blood glucose levels during exercise.

1

- (d) One form of glycogen storage disease is caused by a gene which is recessive and sex-linked.

Describe a pattern of inheritance, shown by a family history, which would indicate that the condition is

recessive _____

1

sex-linked _____

1

Marks

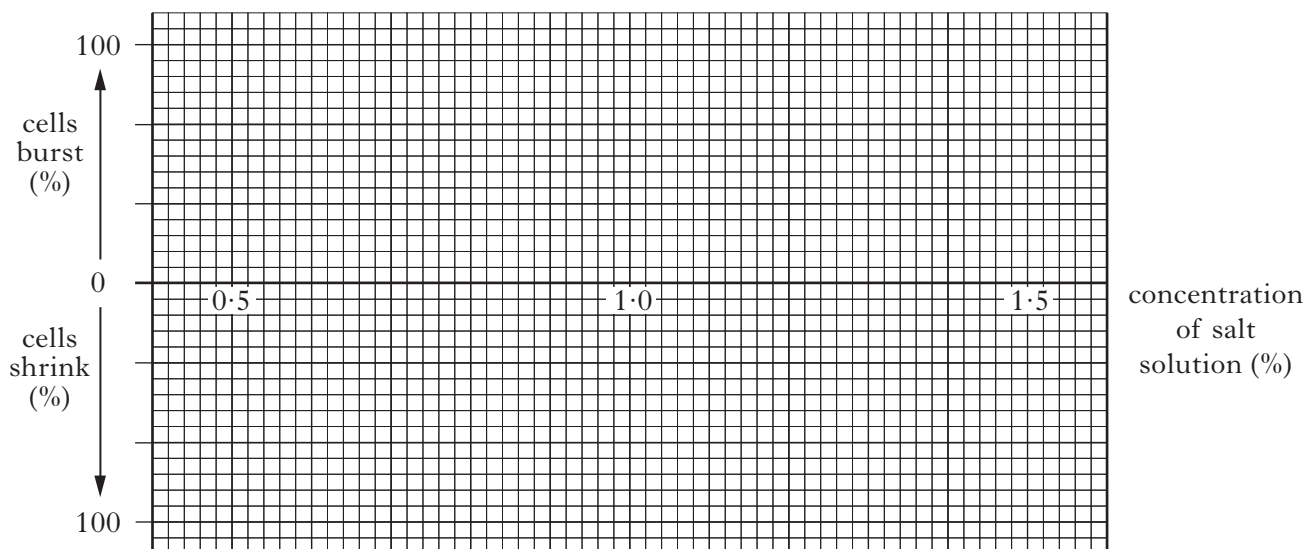
3. In an investigation, samples of red blood cells were placed in different concentrations of salt solution.

After four hours, the samples were examined to find the percentage of cells which had changed as a result of osmosis.

The internal solute concentration of red blood cells is 0.85%.

(a) On the graph below, draw a **straight** line to indicate the expected results from this investigation.

1



(b) Explain why the samples of cells were left in the salt solutions for four hours before being examined.

1

(c) State **one** difference between osmosis and active transport.

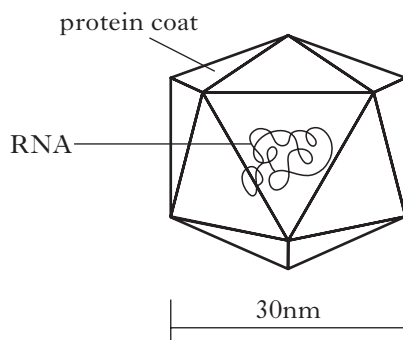
1

(d) Describe the role of ADH in the control of the salt concentration of blood plasma.

2

Marks

4. (a) The diagram below represents the virus that causes polio.



State the characteristic of viruses which allows them to be classified as living organisms.

1

- (b) In the preparation of a polio vaccine, the viral RNA is destroyed and the protein coat is left intact.

Complete the table below to give the reasons for each feature of the vaccine preparation.

<i>Feature of vaccine preparation</i>	<i>Reason</i>
RNA destroyed	
Protein coat left intact	

2

- (c) After a cell has been invaded by a virus, its metabolism is altered to allow viral replication.

Describe the roles of the following cell structures during viral replication.

1 ribosomes _____

2 mitochondria _____

2

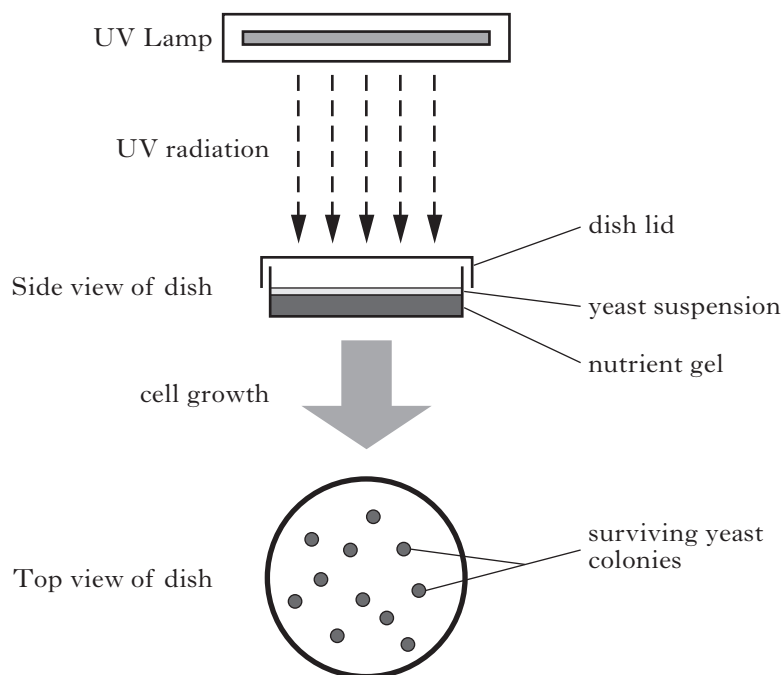
Marks

5. Most skin cancers are caused by overexposure to ultraviolet (UV) radiation from the sun or sunbeds. UV radiation damages the DNA in skin cells. Cells normally repair this damage but those which cannot may become cancerous.

A student designed an investigation which used UV-sensitive yeast cells to show the damaging effect of UV radiation. These yeast cells cannot repair DNA damage and die after exposure to UV radiation.

A suspension of UV-sensitive yeast cells was added to dishes which contained a gel that had all the nutrients the yeast needed to grow. The dishes were then exposed to UV radiation for different lengths of time. After exposure, the dishes were placed in an incubator and each of the surviving yeast cells left to grow into a colony on the gel. The number of these colonies was then counted.

The diagram below illustrates this procedure.



- (a) List **two** variables which should be kept constant during this investigation.

1 _____

2 _____

2

[Turn over

5. (continued)

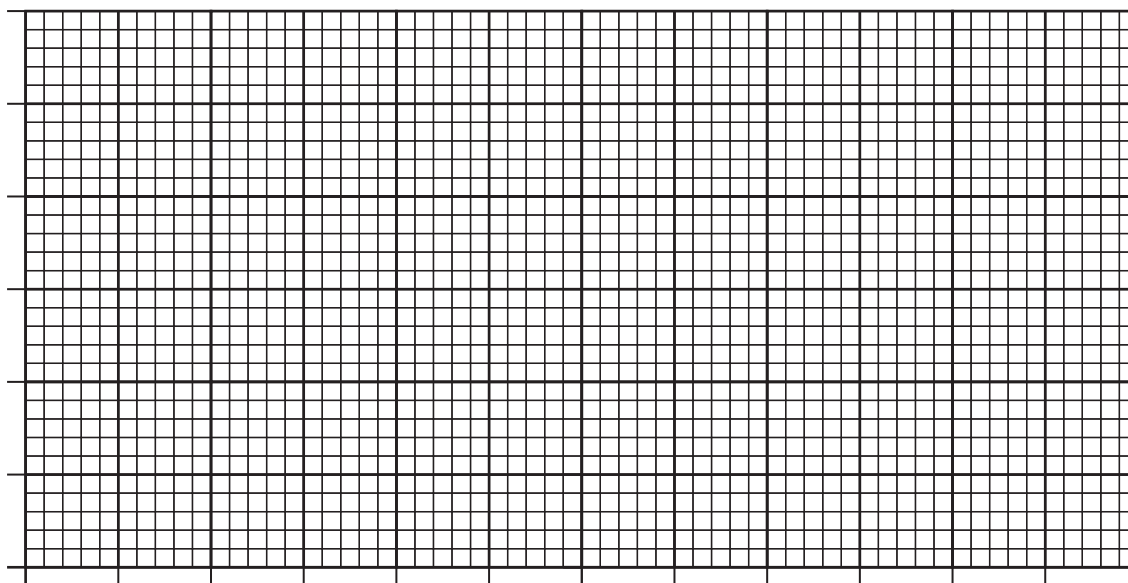
(b) The results of the investigation are shown in **Table 1** below.

Table 1—Yeast growth after exposure to UV radiation

<i>Length of time of exposure (minutes)</i>	<i>Number of yeast colonies growing</i>
10	58
20	32
30	15
40	4
50	1
60	0

(i) Plot a line graph to illustrate the results of the investigation.

(Additional graph paper, if required, can be found on *Page thirty-six*.)



2

(ii) State a conclusion that can be drawn from these results.

1

(iii) State how the reliability of the results in this investigation could be improved.

1

Marks

5. (continued)

- (c) Sunscreens work by blocking UV radiation, preventing it from entering skin cells and causing damage to the DNA, which results in sunburn.

Sunscreens are labelled with a Sun Protection Factor (SPF). When a sunscreen of SPF 15 is applied to the skin, it will take 15 times longer to burn compared to having no sunscreen applied.

The student carried out a second investigation using UV-sensitive yeast. The dishes were prepared as before but this time the lids of the dishes were coated with sunscreens of different SPFs. The dishes were then exposed to UV radiation for 30 minutes. After exposure, the dishes were placed in an incubator and the surviving yeast cells left to grow into colonies. The results are shown in **Table 2** below.

Table 2—Yeast growth after the use of sunscreen protection

<i>Sunscreen used to coat lid (SPF)</i>	<i>Number of yeast colonies growing</i>
6	20
15	72
35	74
50	75

- (i) Use the information from **Tables 1 and 2** to calculate the percentage increase in yeast cell survival when a sunscreen of SPF 50 is used to coat the lid.

Space for calculation

_____ % **1**

- (ii) Official health advice recommends that people should use a sunscreen of SPF 15 when sunbathing for 30 minutes.

State how the results of this investigation support this recommendation.

_____ **1**

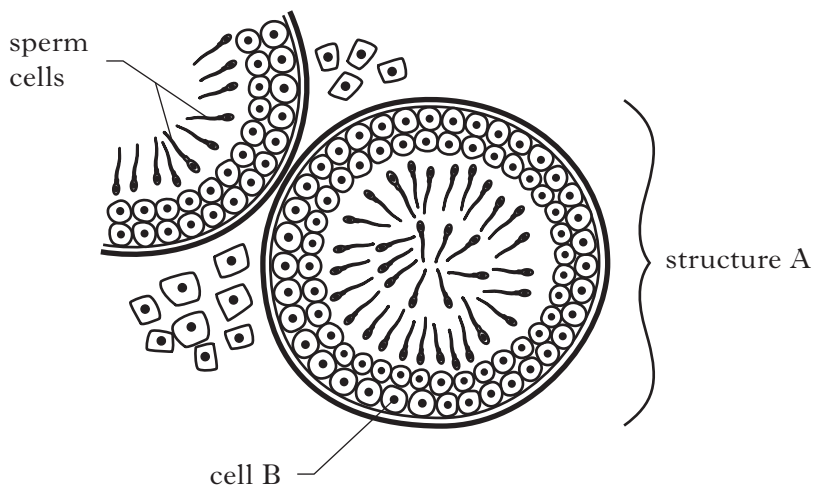
- (iii) If skin starts to burn after 10 minutes in strong sunlight, calculate for how long a sunscreen of SPF 35 would protect the skin.

Space for calculation

_____ **1**

6. The diagram below represents sperm production in a cross section through part of a testis.

Marks



(a) (i) Name structure A.

1

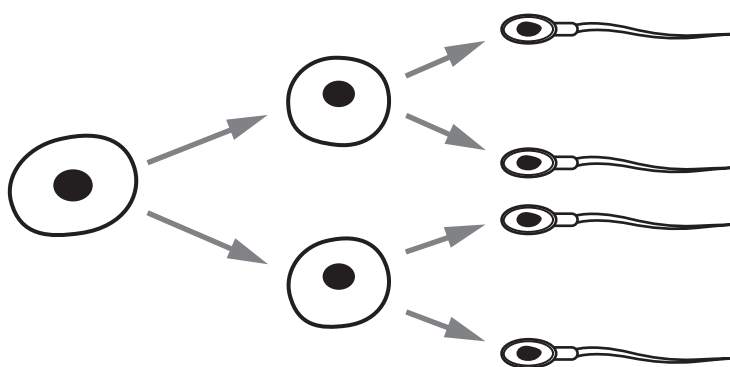
(ii) Describe **two** ways that the pituitary gland stimulates sperm production in structure A.

1 _____

2 _____

2

(b) The diagram below shows cell B dividing to produce sperm cells.



(i) Name this type of cell division.

1

(ii) State how many of the sperm cells shown in this diagram contain

1 an X chromosome _____

2 autosomes _____

1

Marks

6. (continued)

- (c) The average sperm count in the developed world has fallen by one third over the last 15 years.

The present average sperm count is 30 million/cm³ of semen.

Calculate the average yearly fall in sperm production over the 15 year period.

Space for calculation

_____ million/cm³/year **1**

- (d) In fertility clinics, samples of semen are collected to determine if a man is fertile or not.

A man is fertile if his semen contains at least 20 million sperm per cm³. In addition, 75% of the sperm cells must be active and 30% must be of normal shape.

The table below shows the results of semen analysis from four men.

	<i>Men</i>			
	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>
<i>Number of sperm in sample (millions/cm³)</i>	25	22	20	23
<i>Percentage of inactive sperm</i>	20	25	15	30
<i>Percentage of misshapen sperm</i>	70	60	65	50

- (i) State how many of the men are infertile.

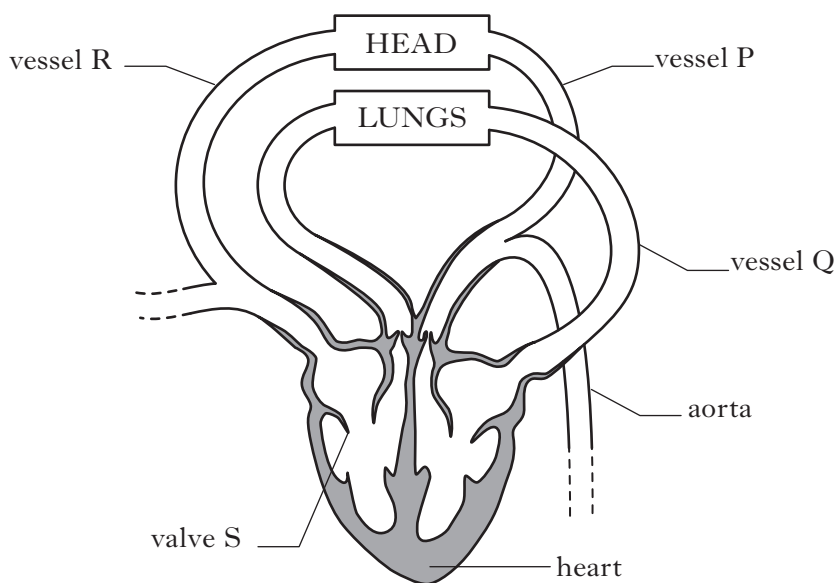
1

- (ii) Explain how artificial insemination could be used to enable a couple to have a child when the man has a low sperm count.

2**[Turn over**

Marks

7. The diagram below represents part of the human circulatory system.



(a) State whether blood vessel Q is the pulmonary artery or the pulmonary vein.
Give a reason for your answer.

Name of Q _____

Reason _____

1

(b) (i) Name blood vessel P.

1

(ii) Describe **one** difference in the structure of blood vessels P and R.

1

Marks

7. (continued)

(c) Explain why the carbon dioxide concentration of the blood changes as it flows through the

1 lungs _____

1

2 head _____

1

(d) Name valve S and describe its function within the heart.

Name _____

Function _____

1

[Turn over

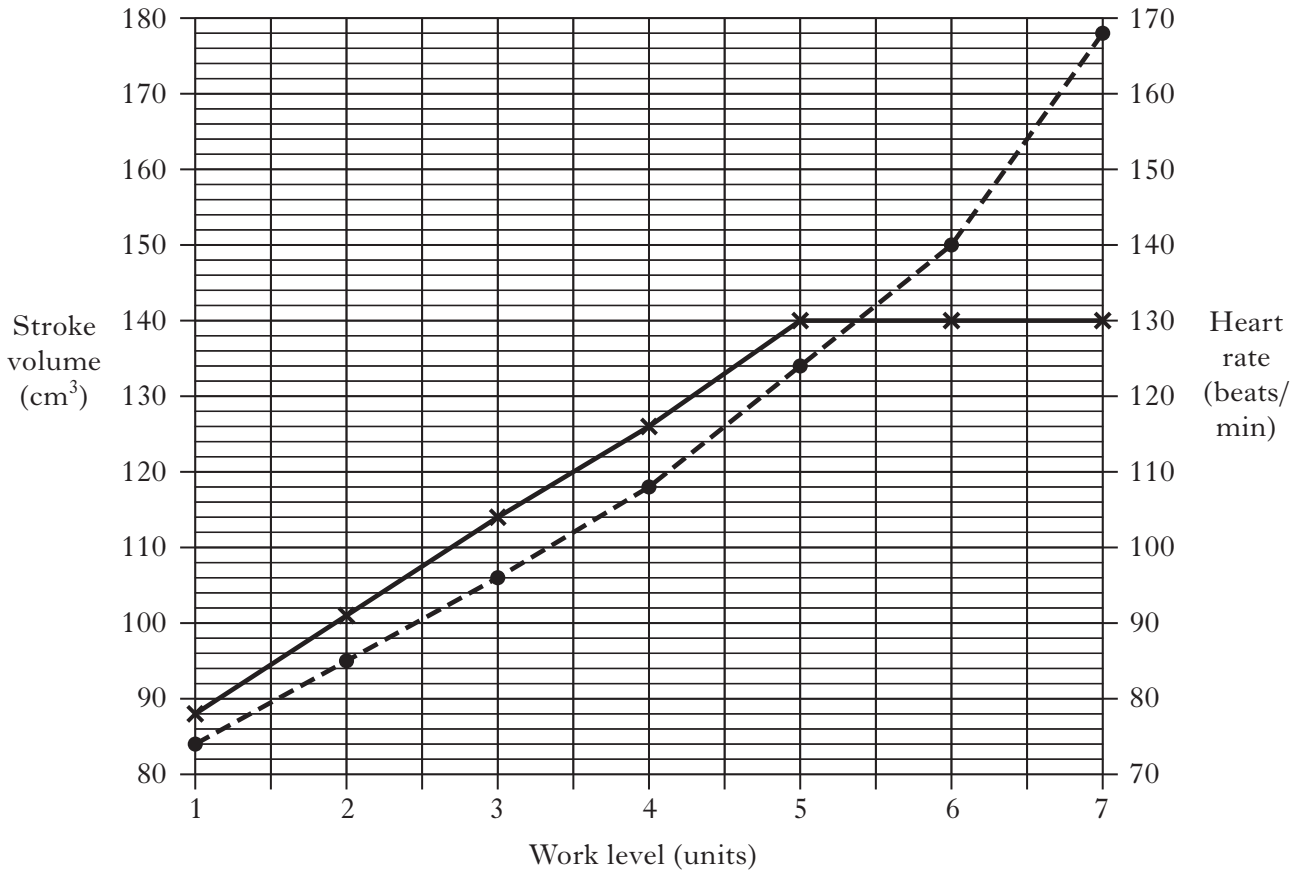
8. The heart rate and stroke volume of a 40 year old cyclist were monitored as he used an exercise bike.

Marks

The cyclist was told to pedal at a constant rate as his work level was gradually raised by increasing the resistance to pedalling.

The graph below shows the changes that occurred in the cyclist's heart rate and stroke volume at seven different work levels.

- × — × stroke volume – volume of blood pumped out per heartbeat
- - - - ● heart rate – beats of heart per minute



- (a) Use data from the graph to describe the changes that occurred in the cyclist's stroke volume when the work level increased from 1 to 7 units.

2

- (b) State what the cyclist's heart rate was when his stroke volume was 120 cm³.

_____ beats/min

1

Marks

8. (continued)

- (c) Cardiac output is the volume of blood leaving the heart in one minute.
It is calculated using the formula shown below.

$$\text{cardiac output} = \text{heart rate} \times \text{stroke volume}$$

Calculate the cyclist's cardiac output when his work level was 6 units.

Space for calculation

_____ cm³/min **1**

- (d) The table below shows the recommended minimum heart rates that cyclists of different ages should maintain in order to either metabolise fat or improve their fitness.

<i>Age</i>	<i>Minimum heart rate for metabolising fat (beats/min)</i>	<i>Minimum heart rate for improving fitness (beats/min)</i>
10	136	168
20	130	160
30	123	152
40	116	144
50	110	136
60	104	128

- (i) Use information from the **table** and the **graph** to determine the work level that the cyclist should maintain in order to metabolise fat.

_____ units **1**

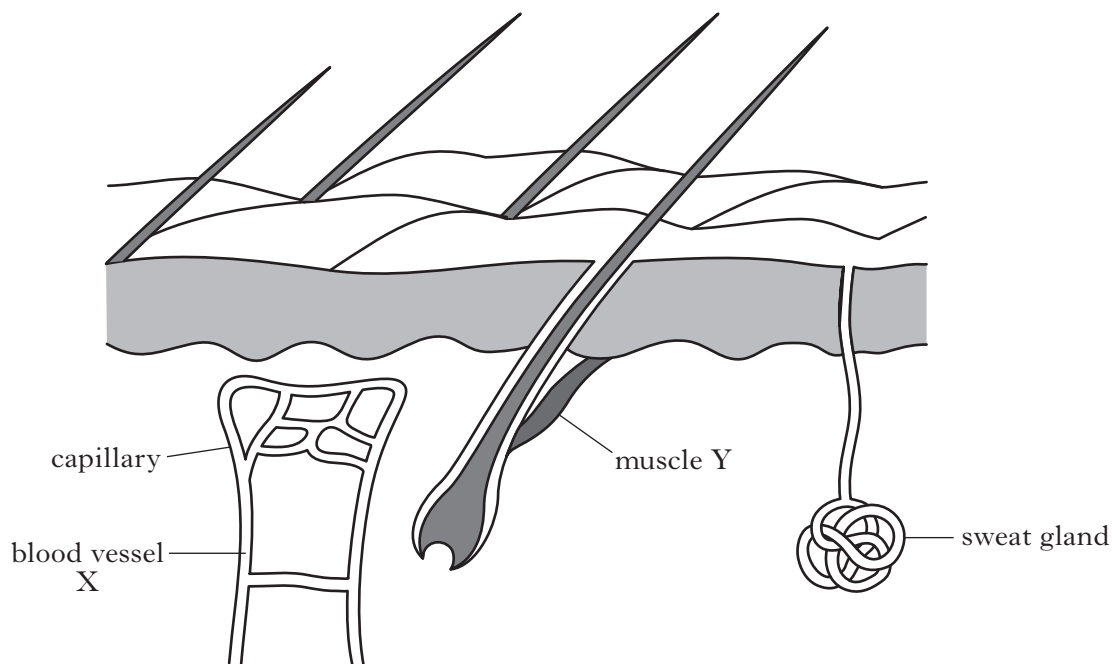
- (ii) Use information from the **table** to predict the minimum heart rate for improving the fitness of a 70 year old.

_____ **1**

[Turn over

9. The diagram below shows some of the structures in skin which are involved in temperature regulation.

Marks



(a) Name the body's temperature monitoring centre.

1

(b) Describe the role of blood vessel X in reducing heat loss from the body.

1

(c) Explain how the contraction of muscle Y could lead to reduced heat loss from the body.

1

(d) Explain how sweating helps to cool the body.

1

(e) Hypothermia occurs when body temperature falls below 35 °C.

Suggest **two** reasons why premature babies are particularly at risk of hypothermia.

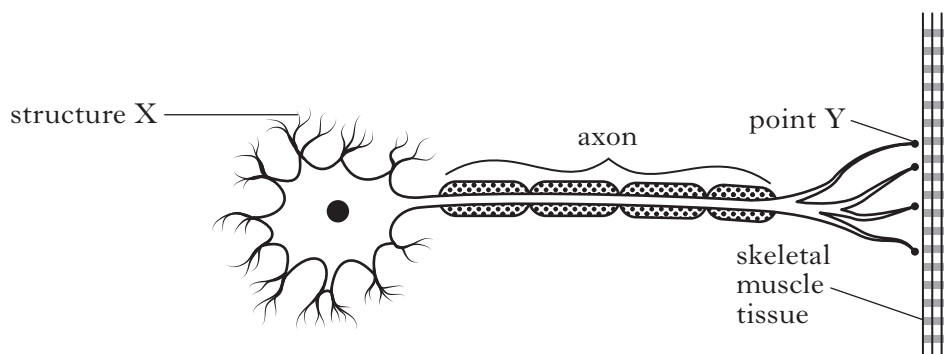
1 _____

2 _____

2

Marks

10. The diagram below represents a motor nerve cell and a neuromuscular junction.



(a) Name structure X and state its function.

Name _____

Function _____

1

(b) Describe how the arrival of an impulse at point Y causes muscle contraction.

2

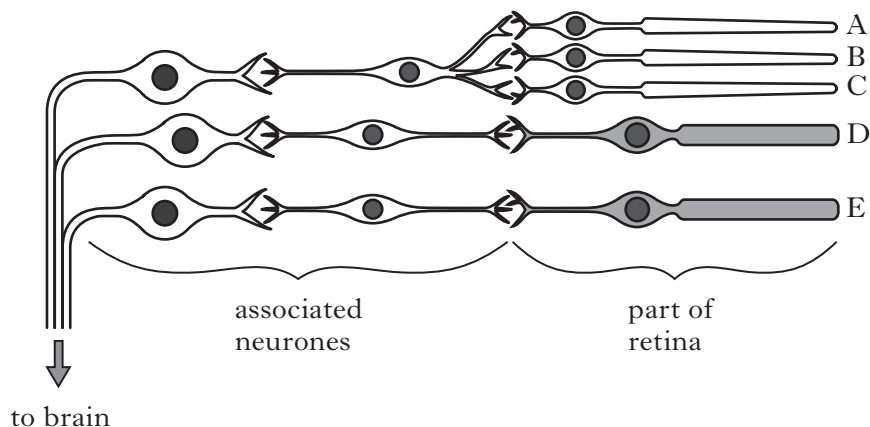
(c) Explain why the skeletal muscle tissue has a striated appearance.

2

[Turn over

Marks

11. The diagram below shows part of the retina including its associated neurones. The structures labelled A–E are light-absorbing cells.



- (a) Name the type of light-absorbing cell represented by A, B and C.

1

- (b) Explain how the arrangement of cells A, B and C, along with their associated neurones, increases the sensitivity of the retina to low light intensities.

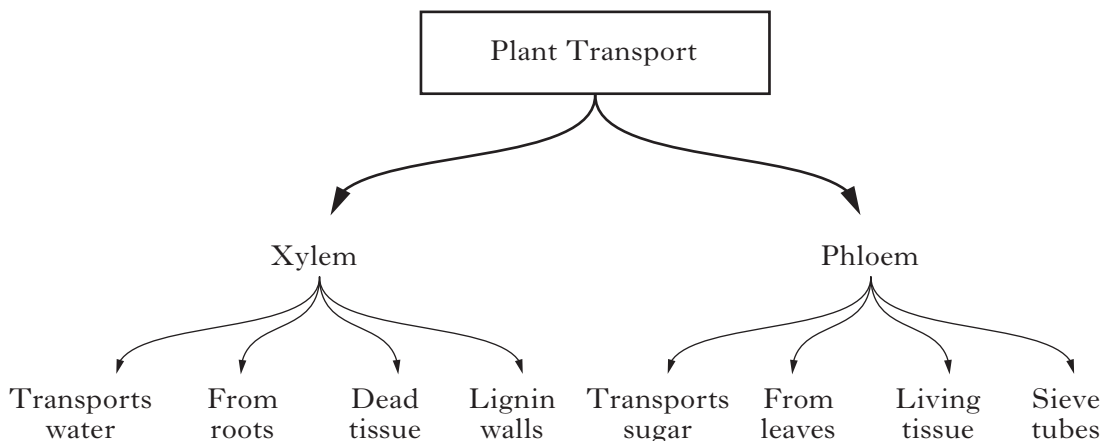
2

- (c) State the part of the brain to which nerve impulses from the retina travel.

1

Marks

12. A biology student produced the following diagram as a memory aid to help her learn about transport in plants.



- (a) In producing this diagram the student used various methods to learn the information.

Other than rehearsal, name **two** methods that she used and describe how they helped her transfer the information into her long-term memory.

1 Method _____

Description _____

1

2 Method _____

Description _____

1

- (b) Any information which is not transferred into long-term memory is displaced. Explain why displacement occurs.

1

- (c) Name the receptor molecule that is thought to have a role in memory storage.

1

[Turn over

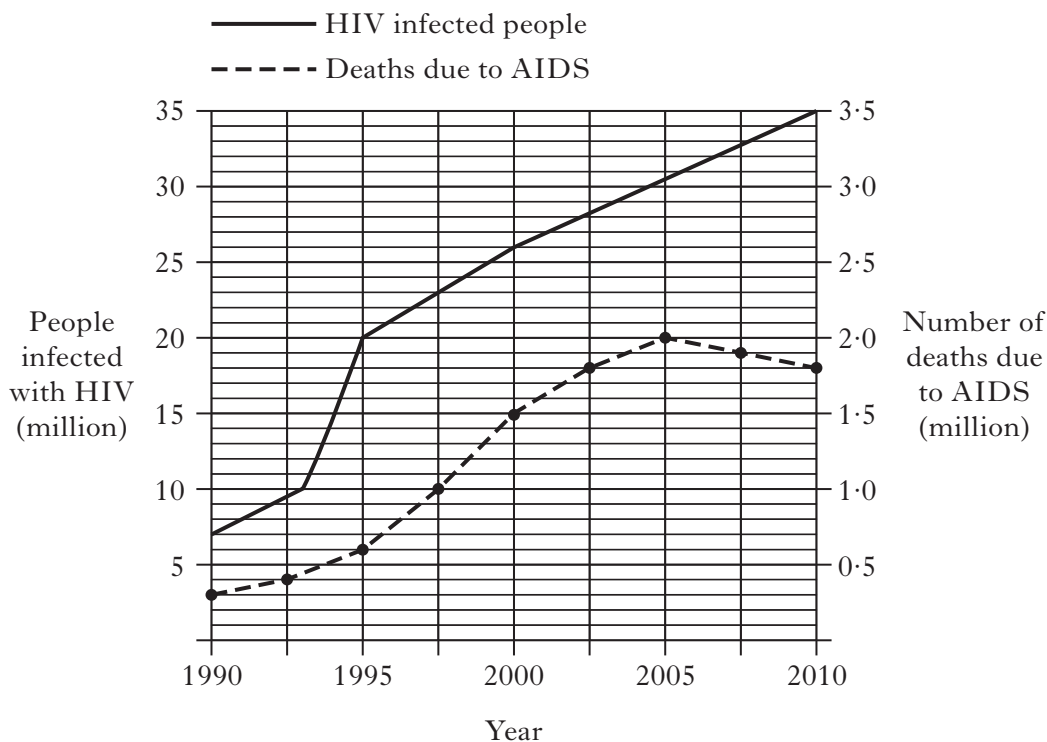
Marks

13. HIV is a virus which invades the cells of the immune system.

People infected with HIV may not show symptoms for many years.

AIDS is the condition which may develop from HIV infection, resulting in death.

The graph below shows the number of people in the world infected with HIV, from 1990 to 2010. It also shows the number of these people who died from AIDS during this period.



(a) State how many people were infected with HIV in the year 2000.

1

(b) State how many people died from AIDS when 20 million people in the world were infected with HIV.

1

(c) Calculate the percentage of HIV-infected people who died from AIDS in 2010.

Space for calculation

_____ %

1

Marks

13. (continued)

- (d) Describe the evidence from the graph which suggests that the rate of people becoming infected with HIV was greatest between 1993 and 1995.

1

- (e) In the absence of a vaccine to prevent HIV infection, suggest how community health programmes might contribute to a reduction in the number of newly-infected people.

1

[Turn over

Marks

14. Fishermen catch a variety of fish species in the North Sea. One of these species is cod.



The table below shows the total mass of cod caught in one area of the North Sea between 1991 and 1999.

It also shows the mass of cod as a percentage of the total annual mass of fish species caught.

<i>Year</i>	<i>Total mass of cod caught (thousand tonnes)</i>	<i>Percentage of total mass of fish that was cod</i>
1991	360	50
1992	300	54
1993	250	58
1994	240	62
1995	200	56
1996	220	52
1997	190	53
1998	180	60
1999	120	57

- (a) (i) Calculate the average yearly decrease in the total mass of cod caught between 1991 and 1999.

Space for calculation

_____ thousand tonnes per year **1**

- (ii) Suggest a factor which may have contributed to the decrease in the total mass of cod caught between 1991 and 1999.

_____ **1**

Marks

14. (continued)

- (b) Express as a simple whole number ratio, the total mass of cod caught in 1991, 1994 and 1999.

Space for calculation

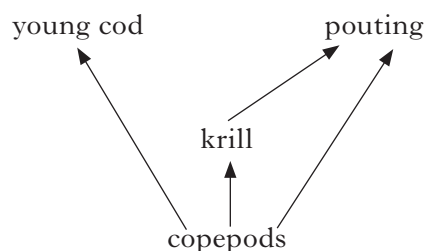
_____ : _____ : _____
1991 1994 1999

1

- (c) Explain how the information in the table provides evidence that fish populations in this area were decreasing in the 1990s.

1

- (d) The diagram below shows part of a food web from the North Sea.



In an attempt to conserve the cod population, fishermen are now catching another species of fish called pouting.

Use the information in the diagram above to suggest why this strategy might actually lead to a further decrease in the cod population.

2

[Turn over for Section C on Page thirty-two

SECTION C

Marks

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 Describe hormonal control of the menstrual cycle under the following headings:

(i) events leading to ovulation;

6

(ii) events following ovulation.

4

(10)**OR**

B Describe the cardiac cycle under the following headings:

(i) the conducting system of the heart;

6

(ii) nervous and hormonal control of the cardiac cycle.

4

(10)

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

2. Answer **either A or B**

A Give an account of the carbon cycle and describe how the activities of man are disrupting it.

(10)**OR**

B Give an account of the nitrogen cycle and describe how the activities of man are disrupting it.

(10)

[END OF QUESTION PAPER]

SPACE FOR ANSWERS

Marks

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SPACE FOR ANSWERS

Marks

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SPACE FOR ANSWERS

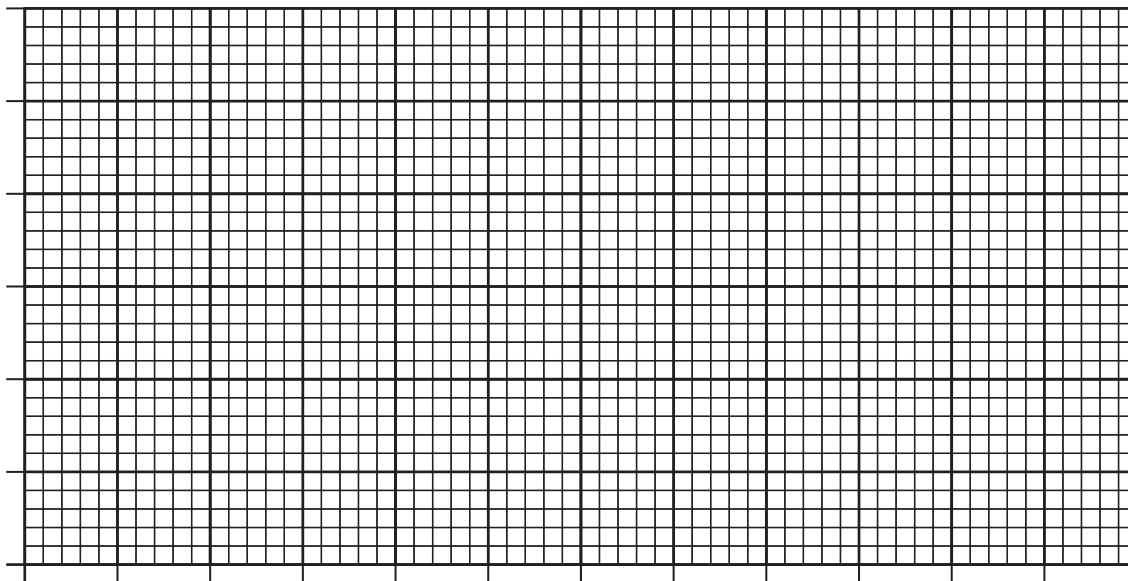
Marks

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SPACE FOR ANSWERS

Marks

ADDITIONAL GRAPH PAPER FOR QUESTION 5(b)(i)



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