FOR OFFICIAL USE

Presenting Centre No.	Subject No.	Level	Paper No.	Group No.	Marker's No.

Total

[C009/SQP023]

Higher Human Biology

Time: 2 hours 30 minutes

NATIONAL QUALIFICATIONS

Specimen Question Paper

Fill in these boxes and read what is printed below.

Full name of school or college

Town

First name and initials

Surname

Date of birth
Day Month Year

Candidate number

Number of seat

SECTION A—Questions 1–30

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

SECTIONS B AND C

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 and rough work 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.

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.

SCOTTISH QUALIFICATIONS

SECTION A

Read carefully

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

2 Fill in the details required on the answer sheet.

3 In this section a question is answered by indicating the choice A, B, C or D by a stroke made in **ink** in the appropriate place in the answer sheet—see the sample question below.

4 For each question there is only **one** correct answer.

5 Rough working, if required, should be done only on this question paper—or on the rough working sheet provided—**not** on the answer sheet.

6 At the end of the examination the answer sheet for Section A **must not** be placed inside this answer book, but should be handed separately to the invigilator.

Sample Question

The digestive enzyme pepsin is most active in the

A mouth

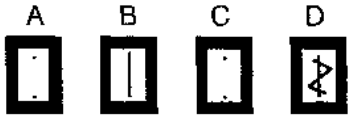
B stomach

C duodenum

D pancreas.

The correct answer is **B**—stomach. A **heavy** vertical line should be drawn joining the two dots in the appropriate box in the column headed **B** as shown in the example on the answer sheet.

If, after you have recorded your answer, you decide that you have made an error and wish to make a change, you should cancel the original answer and put a vertical stroke in the box you now consider to be correct. Thus, if you want to change an answer D to an answer B, your answer sheet would look like this:



If you want to change back to an answer which has already been scored out, you should enter a tick (✓) to the **right** of the box of your choice, thus:

SECTION A

All questions in this section should be attempted.

Answers should be given on the separate answer sheet provided.

1. Which of the following substances are both polysaccharides?

A Glycogen and glucose

B Starch and maltose

C Maltose and glucose

D Glycogen and starch

2. Which of the following substances does **not** contain the element nitrogen?

A Protein

B Pepsin

C Ammonia

D Glycogen

3. Which of the following is a function of lipid molecules?

A They act as antibodies.

B They transport vitamins.

C They assist muscular contractions.

D They act as biological catalysts.

4. When a protease enzyme is added to an amylase solution, which of the following could be produced?

A Amino acids

B Maltose

C Glucose

D Glycerol

5. The mRNA codon for the amino acid tyrosine is UAU. Which of the following base sequences is the tRNA anticodon for tyrosine?

A TUT

B ATA

C GTG

D AUA

6. A section of a DNA molecule contains 80 bases. Of these, 24 are thymine.

The percentage of cytosine bases in the molecule is

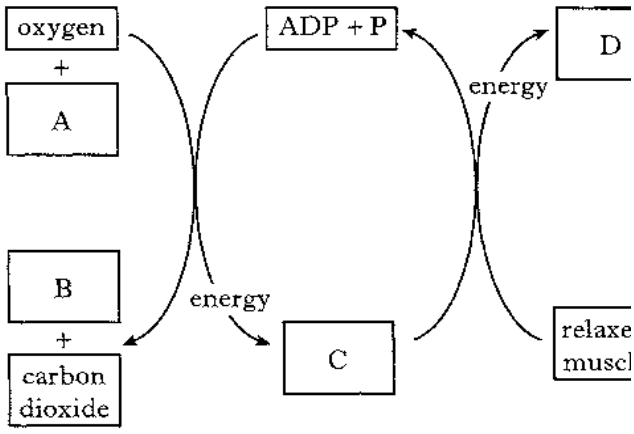
A 12%

B 16%

C 20%

D 32%.

7. The diagram below represents stages in tissue respiration.



Which box represents glucose?

8. Which of the following substances are produced during the Krebs cycle?

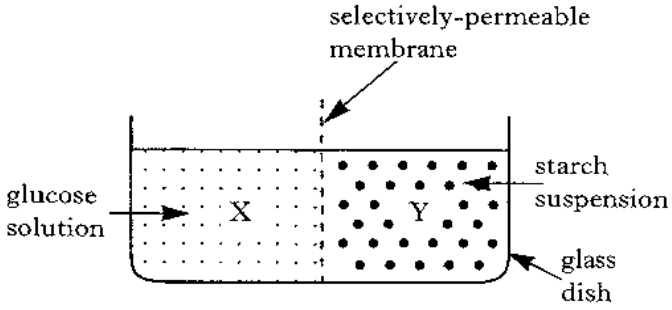
A Carbon dioxide and hydrogen

B Carbon dioxide and water

C ATP and oxygen

D ATP and water

9. The following experiment was set up and left for 24 hours.



Which carbohydrates would be present in X and Y after the 24 hours?

	X	*Y*
A	glucose and starch	glucose and starch
B	glucose only	glucose and starch
C	glucose only	starch only
D	glucose and starch	starch only

10. The key shown below is used for the identification of carbohydrates.

1 soluble 2
insoluble ..... Glycogen

2 Benedict's text positive 3
Benedict's test negative ..... Sucrose

3 Barfoed's test positive 4
Barfoed's test negative ..... Lactose

4 Clinistix test positive ..... Glucose
Clinistix test negative ..... Fructose

Which line in the table of results below is **not** in agreement with the information contained in the key?

	Carbohydrate	*Benedict's test*	*Barfoed's test*	*Clinistix test*
A	Lactose	positive	negative	not tested
B	Glucose	positive	negative	positive
C	Fructose	positive	positive	negative
D	Sucrose	negative	not tested	not tested

11. A student requires 100 cm^3 of urea solution of strength 0·25 M. How may this solution be obtained from a 0·5 M stock solution?

A By adding 50 cm^3 of water to 50 cm^3 of stock solution

B By adding 33·3 cm^3 of stock solution to 66·6 cm^3 of water

C By concentrating the stock solution five times

D By diluting the stock solution five times

12. Viruses are composed principally of

A protein and lipid

B nucleic acid and protein

C lipid and carbohydrate

D nucleic acid and carbohydrate.

13. A person exposed to a disease-causing antigen may suffer from that disease.

This person may then be immune to the disease.

This is an example of

A artificial active immunity

B natural active immunity

C artificial passive immunity

D natural passive immunity.

14. A person has blood group O.

Which entry on the table identifies correctly the antigens and antibodies present?

	Antigens on cells	*Antibodies in plasma*
A	A and B	Anti-a and Anti-b
B	None	Anti-a and Anti-b
C	A and B	None
D	None	None

15. Red-green colour-blindness is a sex-linked recessive trait. A woman whose father is colour-blind marries a man with normal vision. If they have a son, what are the chances that he will be colour-blind?

A 0%

B 25%

C 50%

D 100%

16. Oxytocin is released by the

A ovaries

B placenta

C corpus luteum

D pituitary.

17. Monozygotic twins result from

A one fertilised egg cell

B one egg cell and two sperm

C two egg cells and one sperm

D two egg cells and two sperm.

18. The following data refer to the breathing of an athlete (a) resting and (b) just after a race.

	Breathing rate (per minute)	*Volume of one breath*	*% Carbon dioxide in exhaled air*
Resting (a)	10	300 ml	5
After race (b)	20	1 litre	5

Assuming the rate of breathing remains constant, what would be the volume of carbon dioxide breathed out during the ten minutes after the race?

A 500 ml

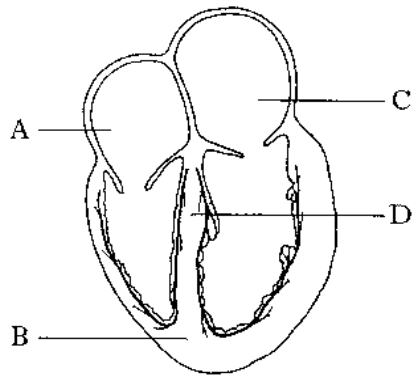
B 1000 ml

C 5 litres

D 10 litres

19. The diagram below is of a heart.

Which label identifies the position of the sinoatrial node (SAN)?



20. The durations of diastole and systole are shown below.

Diastole	0·3 seconds
Systole	0·1 seconds

What is the heart rate of this individual?

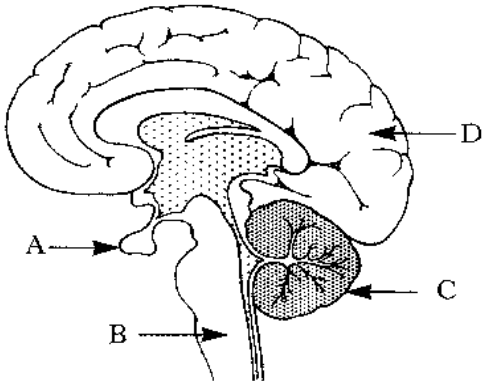
A 48 beats per minute

B 75 beats per minute

C 150 beats per minute

D 240 beats per minute

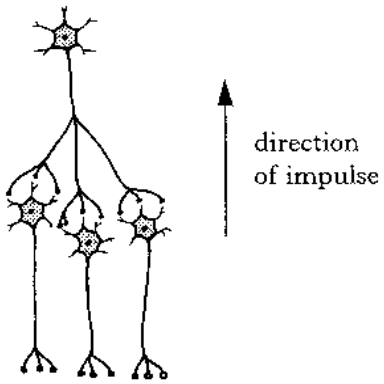
Questions 21 and 22 refer to the drawing of a section through the brain.



21. Which letter indicates the part of the brain which controls heart rate?

22. Which letter indicates the cerebral cortex?

23. The following diagram represents four neurones in a nervous pathway.



Which line of the table describes the pathway correctly?

	Type of pathway	
A	motor	divergent
B	motor	convergent
C	sensory	divergent
D	sensory	convergent

24. Which line of the table shows correctly the influence of the parasympathetic nervous system?

	Heartbeat	*Blood flow to gut*	*Sweating*
A	increased	increased	increased
B	increased	decreased	increased
C	decreased	decreased	decreased
D	decreased	increased	decreased

25. The average span of the short-term memory is

A less than 4 items

B around 7 items

C around 10 items

D more than 12 items.

26. Which procedure would allow the change in size of a human population to be calculated?

A Adding births to deaths and subtracting immigrations and emigrations

B Adding births to emigrations and subtracting deaths and immigrations

C Adding births to immigrations and subtracting deaths and emigrations

D Adding deaths to immigrations and subtracting births and emigrations

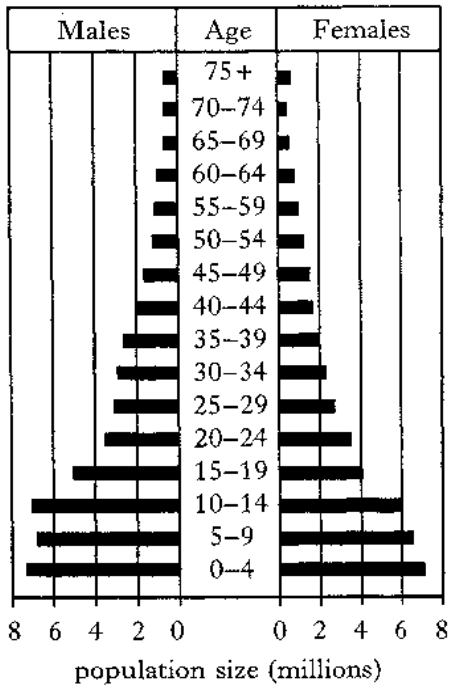
27. The table shows the birth rates and death rates in four continents.

Continents	*Birth rate per 1000*	*Death rate per 1000*
Africa	46	20
North America	18	9
South America	39	10
Europe	18	10

Which line of the table below identifies correctly the continents with the highest and lowest population growth rates?

	POPULATION GROWTH RATES	
	Highest	*Lowest*
A	Africa	North America
B	Africa	Europe
C	South America	North America
D	South America	Europe

28. The population pyramid for a country is shown below.



How many males are there between the ages of 10 and 19?

A 6 million

B 7 million

C 12 million

D 22 million

29. Algal blooms in lakes are most likely to be the result of

A low oxygen concentrations

B over-fishing

C fertiliser run-off

D nitrogen deficiency.

30. Which of the following processes keeps atmospheric carbon dioxide concentrations low?

A Decomposition

B Nitrogen fixation

C Respiration

D Photosynthesis

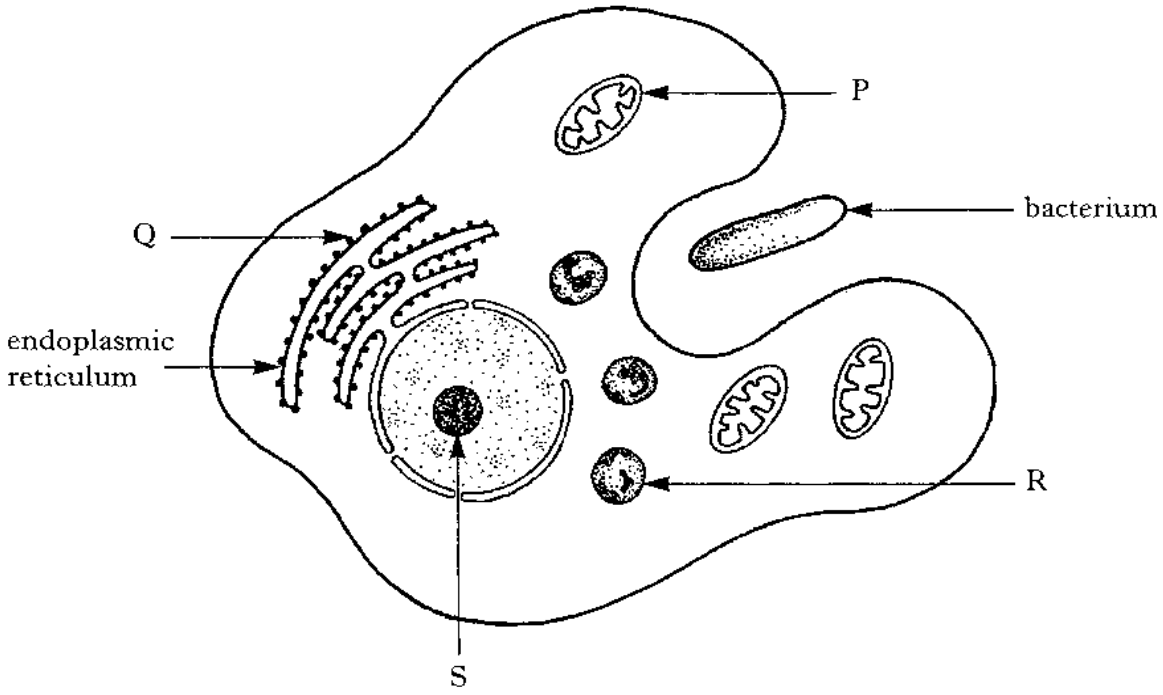
Candidates are reminded that the answer sheet MUST NOT be returned <u>inside</u> this answer book.

Marks

SECTION B

All questions in this section should be attempted.

1. The diagram below shows a macrophage engulfing a bacterium.



(*a*) The table gives some information about organelles shown in the diagram. Complete the table by inserting the appropriate letters, names and functions.

Letter	*Name of organelle*	*Function*
P		provides ATP for membrane movement
	Lysosome	
		synthesis of protein

(3)

(*b*) What term is used to describe the engulfing process shown in the diagram?

_____

(1)

1. (continued)

Marks

(*c*) Another type of white blood cell could destroy this bacterium by producing antibodies.

(i) Name this type of white blood cell.

_____ **(1)**

(ii) What feature of the bacterium stimulates the production of antibodies?

_____ **(1)**

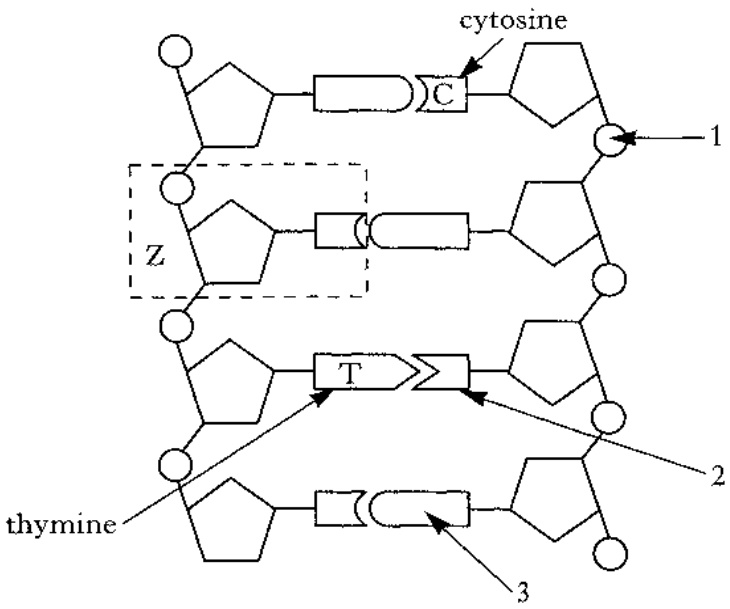
(iii) Describe how the production of antibodies can be stimulated artificially.

_____

_____ **(1)**

Marks

2. The diagram below shows part of a nucleic acid molecule.



(*a*) (i) Which type of nucleic acid is shown in the diagram?

_____ **(1)**

(ii) Name the part of the molecule inside box Z.

_____ **(1)**

(iii) Identify parts labelled 1, 2 and 3 on the diagram.

1 _____

2 _____

3 _____ **(2)**

(*b*) Describe a structural feature of this nucleic acid not shown in the diagram above.

_____ **(1)**

(*c*) During replication of a nucleic acid the base sequence might be copied incorrectly.

(i) Give the term used to describe this type of alteration.

_____ **(1)**

(ii) Describe how this alteration might affect a metabolic pathway.

_____

_____ **(1)**

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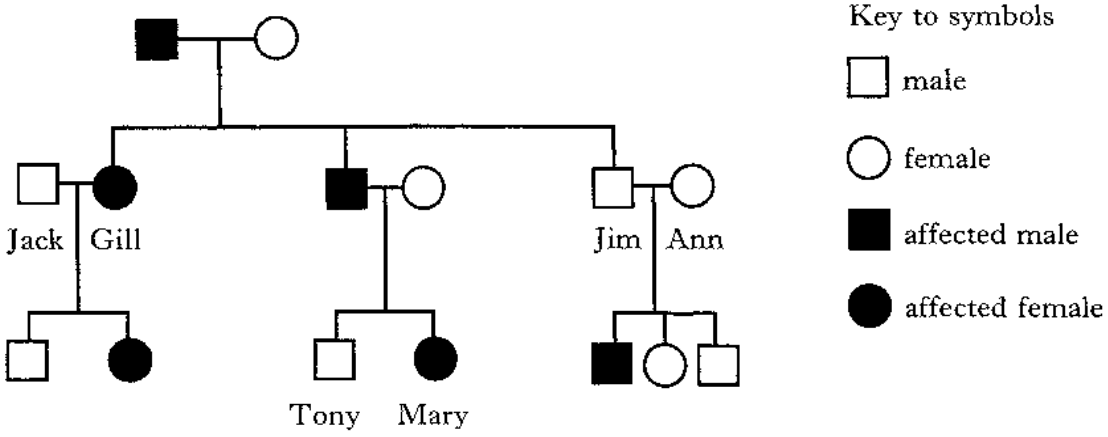
Marks

3. The family tree below shows the inheritance of a genetic disorder.



(*a*) State whether the disorder is dominant or recessive and give a reason for your answer.

Dominant/recessive _____ **(1)**

Reason _____

_____

_____ **(1)**

(*b*) Using symbols **B** and **b** to represent the alleles, give the genotypes of Tony and Mary.

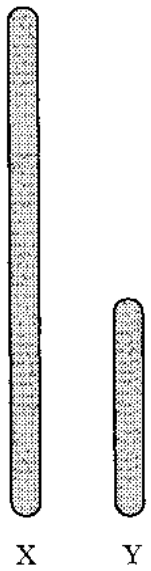
Tony _____ Mary _____ **(1)**

(*c*) Jack and Gill are expecting a third child.
What is the percentage chance of this child inheriting the disorder?

_____ % **(1)**

4. The diagram below represents the two sex chromosomes.

Marks



(*a*) Using the letter H, mark on the diagram the likely position of the sex-linked allele which causes haemophilia. **(1)**

(*b*) What term is used to describe the other 44 chromosomes found in a normal diploid cell?

_____ **(1)**

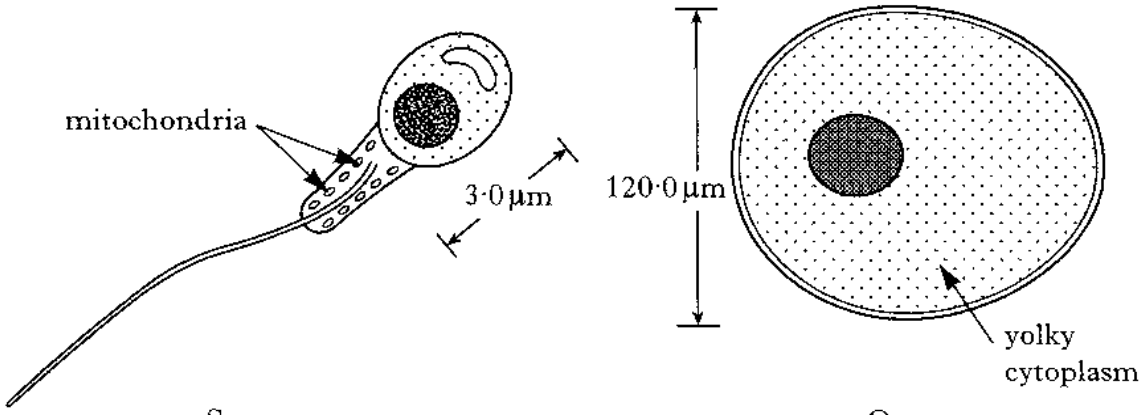
(*c*) Describe how a karyotype can be used to detect genetic disorders.

_____

_____ **(1)**

Marks

5. The diagrams below show a sperm and an ovum.



(*a*) (i) Calculate the total length of the sperm.

_____ **(1)**

(ii) Express the length of the sperm and the length of the ovum as a simple ratio.

_____ : _____ **(1)**
sperm ovum

(iii) Explain why there is such a difference in size between the ovum and the sperm.

_____

_____ **(1)**

(*b*) Why is it necessary for sperm to have large numbers of mitochondria?

_____

_____ **(1)**

(*c*) Complete the table below to show the functions of FSH and LH (ICSH) in males.

Hormone	*Function*
FSH	
LH (ICSH)	

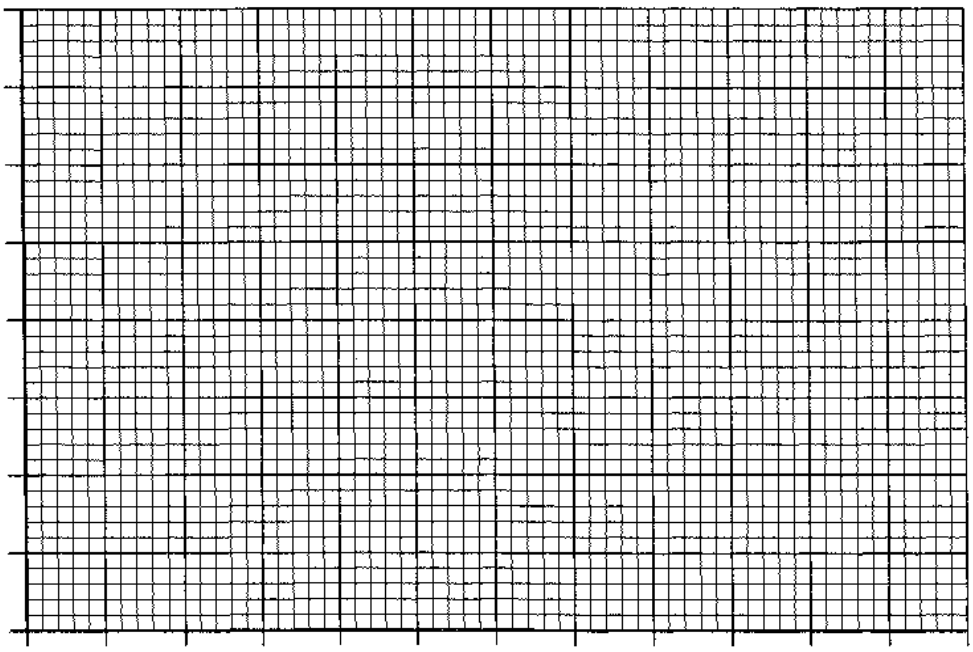
(2)

Marks

6. The table below shows the results of an investigation into the relationship between the birth weight of babies and concentrations of lead and zinc in the placentas.

Birth weight (kg)	*Average lead concentration in placenta (μg/kg)*	*Average zinc concentration in placenta (μg/kg)*
2·00–2·49	31	33
2·50–2·99	22	41
3·00–3·49	13	60
3·50–3·99	12	58
4·00–4·49	11	55
4·50–4·99	13	59

(*a*) Present the data in a suitable form on the graph paper.
(Additional graph paper, if required, will be found on page 16.)



(3)

6. (continued)

Marks

(*b*) (i) Describe the relationship between placental lead and birth weight and between placental zinc and birth weight.

Lead _____

_____

Zinc _____

_____ **(2)**

(ii) Suggest the effect of zinc on enzyme activity.

_____ **(1)**

(*c*) How might a metal ion, such as lead, reach the placenta from the environment?

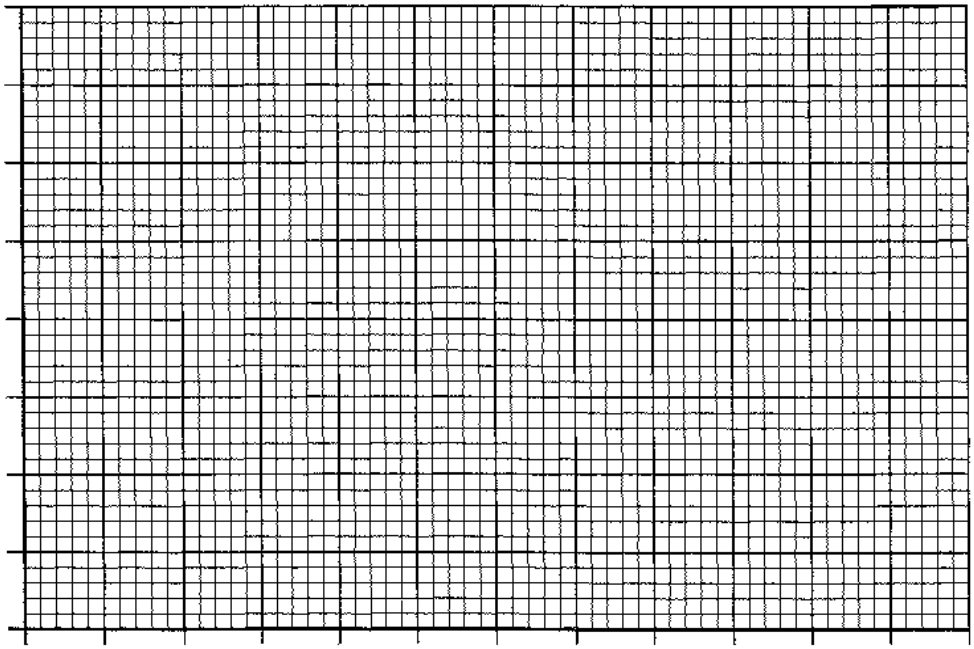
_____

_____

_____ **(2)**

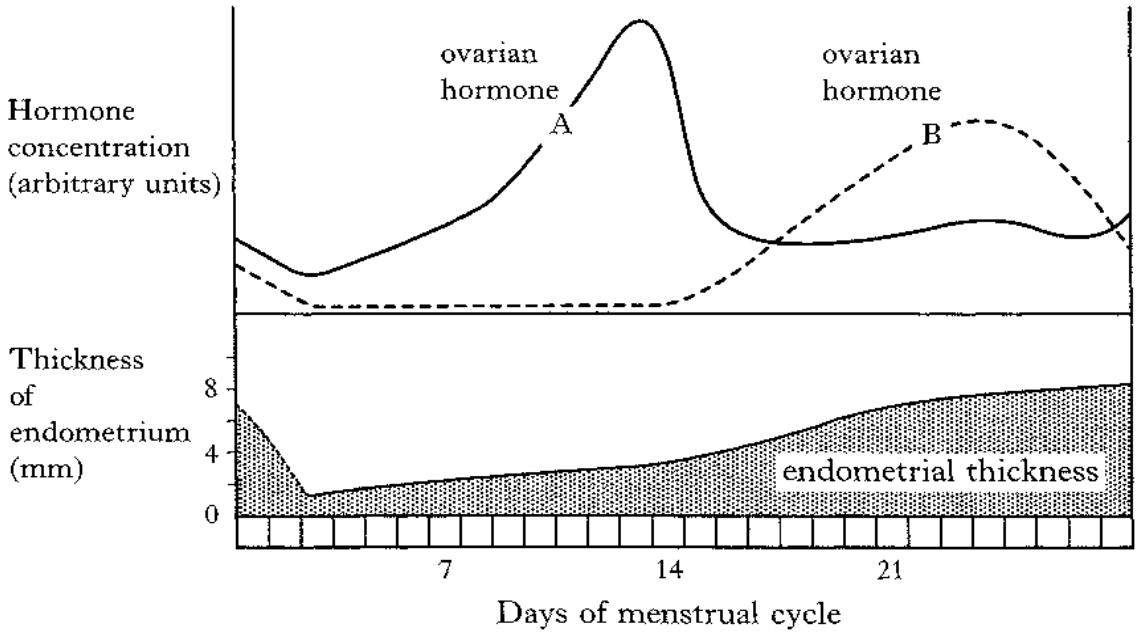
ADDITIONAL GRAPH PAPER FOR QUESTION 6

Marks



Marks

7. The diagram below shows the relationship between the ovarian hormones A and B and the thickness of the endometrium of the uterus.



(*a*) Name the hormones A and B.

A _____

B _____ **(2)**

(*b*) Shade in **five** boxes under the graph which correspond to the fertile period. **(1)**

(*c*) Describe **two** events which occur in the Graafian follicle during the fertile period.

1 _____

_____

2 _____

_____ **(2)**

(*d*) (i) What is the function of the endometrium?

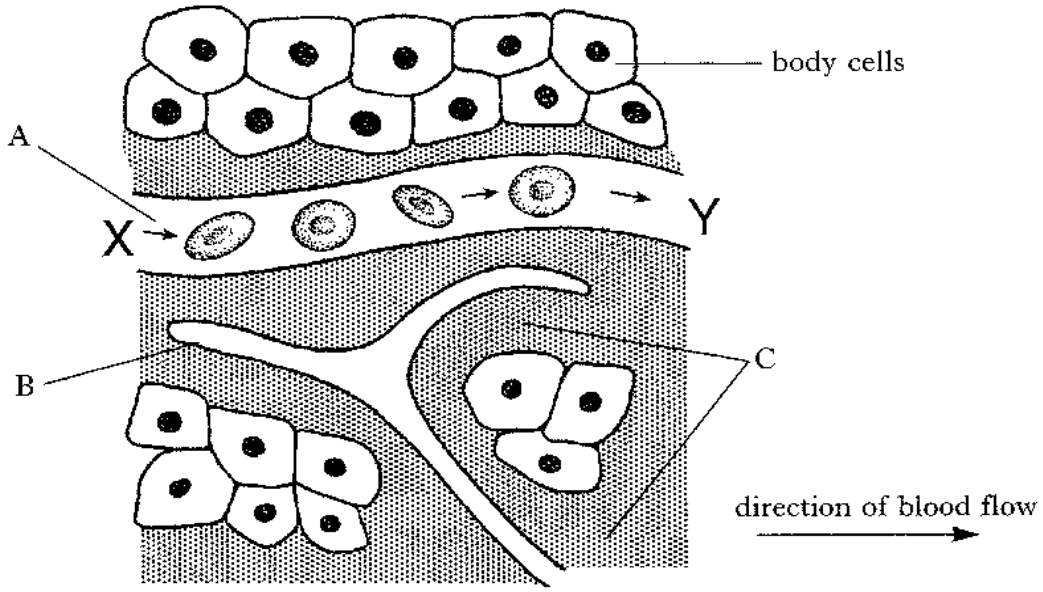
_____ **(1)**

(ii) What happens to the endometrium if a woman becomes pregnant?

_____ **(1)**

write i
mar

8. The diagram below shows the relationship between the circulatory system and body cells. *Marks*



(*a*) Identify fluids found at A, B and C.

A _____

B _____

C _____ **(2)**

(*b*) The composition of blood changes as it flows between points X and Y on the diagram. Complete the table below using the words **increase** or **decrease** to indicate the changes which occur.

Substance	*Change in concentration* X→Y
Glucose	
Oxygen	
Carbon dioxide	
Metabolic waste	

(1)

(*c*) Explain why the blood pressure drops as the blood flows from point X to point Y.

_____

_____ **(1)**

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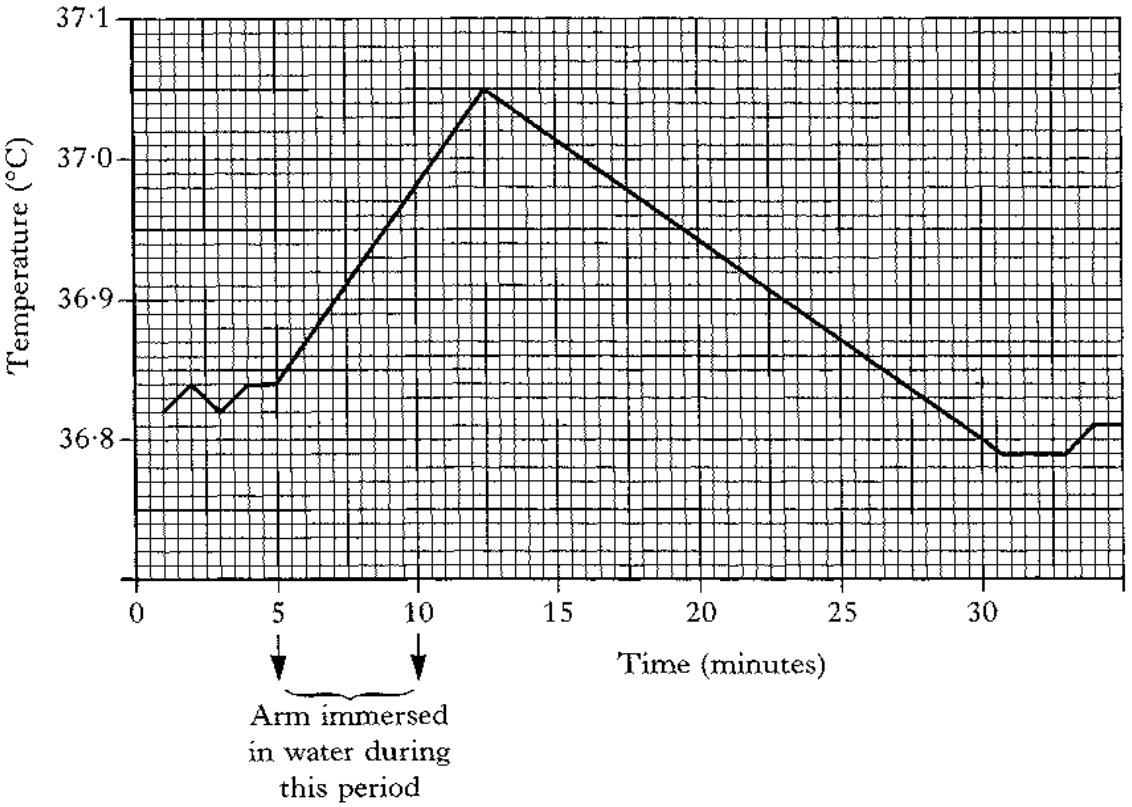
Marks

9. The graph below shows changes in the body temperature of a student during an experiment in which she puts her arm into hot water.



(*a*) (i) What was the highest temperature recorded?

_____ **(1)**

(ii) Explain why the body temperature increased when the arm was placed in the hot water.

_____

_____ **(1)**

(iii) Suggest a reason why the body temperature was lower at the end of the experiment than at the beginning.

_____

_____ **(1)**

(*b*) (i) Where in the brain is body temperature monitored?

_____ **(1)**

(ii) Which division of the nervous system is involved in the involuntary control of body temperature?

_____ **(1)**

10. The three Figures below show data relating to the ageing process.

Figure 1

Changes in body tissue composition with age

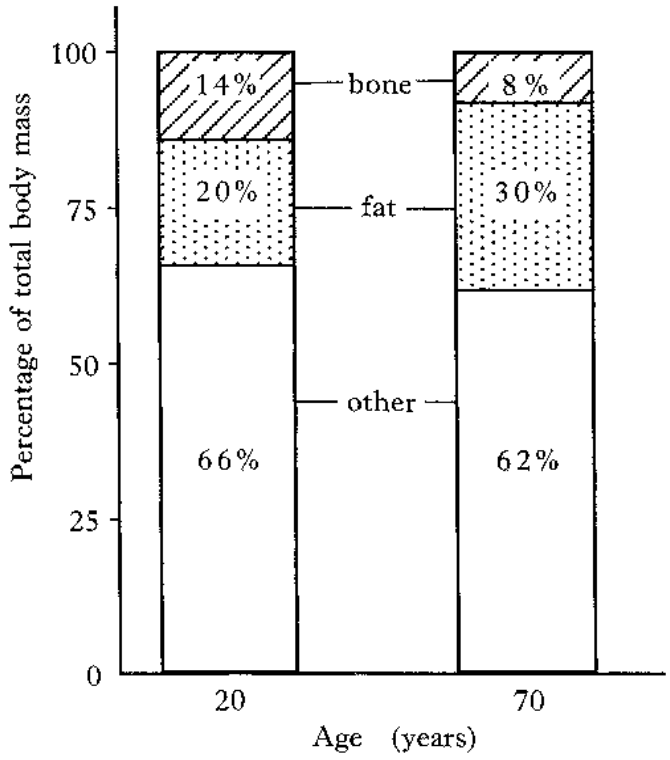


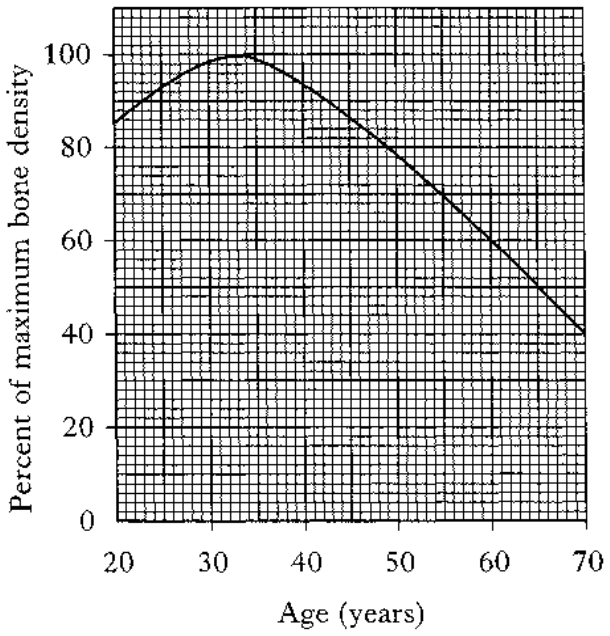
Figure 2

Changes in protein requirement with age

Age (years)	*Average daily protein required (g/kg body mass)*	*Average body mass (kg)*
8	1·5	28
20	0·8	75
70	0·6	70

Figure 3

Changes in bone density with age



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10. (continued)

Marks

(*a*) With reference to **Figures 1** and **2**, calculate the total bone mass of an average twenty-year-old person and an average seventy-year-old person.

Space for calculation

Twenty-year-old _____ Seventy-year-old _____ **(1)**

(*b*) Calculate the average yearly loss of bone mass from the age of 20 to the age of 70.

Space for calculation

_____ g/year **(1)**

(*c*) What information provided in **Figure 3** would suggest that it is misleading to calculate the average yearly loss of bone mass between the ages of 20 and 70?

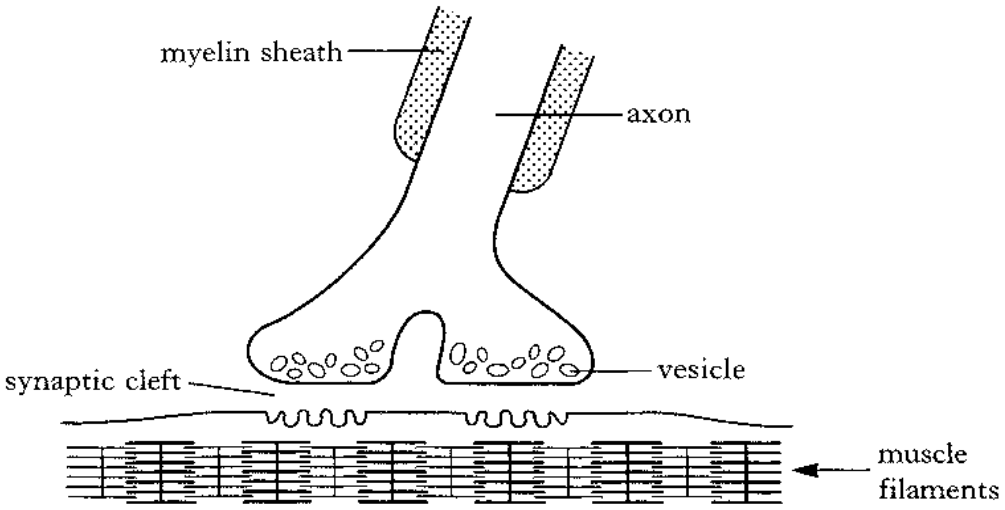
_____

_____ **(1)**

write
mar

Marks

11. The diagram below shows a neuromuscular junction.



(*a*) How does the presence of the myelin sheath affect the transmission of the nerve impulse along the axon?

_____ **(1)**

(*b*) (i) What type of substance is found in the vesicle?

_____ **(1)**

(ii) Describe how the arrival of a nerve impulse at the neuromuscular junction results in stimulation of the muscle.

_____

_____

_____

_____ **(2)**

(*c*) (i) State whether the muscle is contracted or relaxed.

_____ **(1)**

(ii) Name the two proteins found in the muscle filaments.

_____ and _____ **(1)**

write in
marg

Marks

12. **Table 1** below contains a number of terms that apply to learning behaviour. **Table 2** contains descriptions of different types of learning behaviour.

Table 1

imitation	**generalisation**	**extinction**
discrimination	**shaping**	**social facilitation**

Table 2

Statement about behaviour	*Term used to describe behaviour*
Disappearance of a behavioural pattern which is not reinforced	
Production of an identical response to different but related stimuli	
Learning through the observation of others	
Production of an altered response to different but related stimuli	

(*a*) Use the correct terms from **Table 1** to complete **Table 2**. **(3)**

(*b*) Many parents use reinforcement in an effort to shape the behaviour of young children. Use an example to help explain this statement.

Example _____

_____

Explanation _____

_____ **(1)**

(*c*) The aim of road safety campaigns is to persuade people not to drink and drive. What behavioural term is used to describe the process of influencing people through persuasion?

_____ **(1)**

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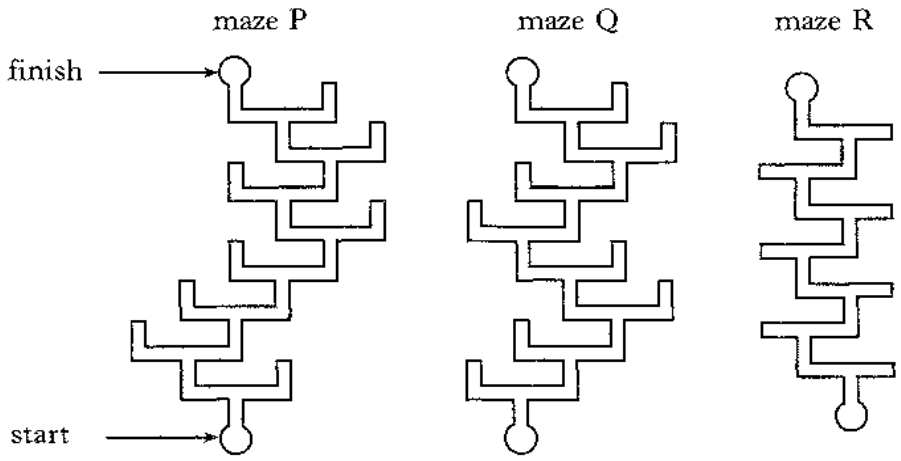
mar

Marks

13. A series of tests was carried out to find out how quickly a student could learn to run three different finger mazes. The mazes are shown in the diagrams below.



(*a*) (i) The student learned to complete maze Q more quickly than maze P. It was suggested that this was by chance.

Indicate whether you agree or disagree with this hypothesis by ticking the appropriate box. Give a reason for your answer.

Agree ☐ Disagree ☐

Reason _____

_____

_____ **(1)**

(ii) Describe how the hypothesis stated in part (i) could be tested.

_____

_____

_____

_____ **(1)**

write i
mar

13. (continued)

Marks

(*b*) Suggest **three** reasons why the student was able to complete maze R more quickly than the other two mazes.

1 _____

_____

2 _____

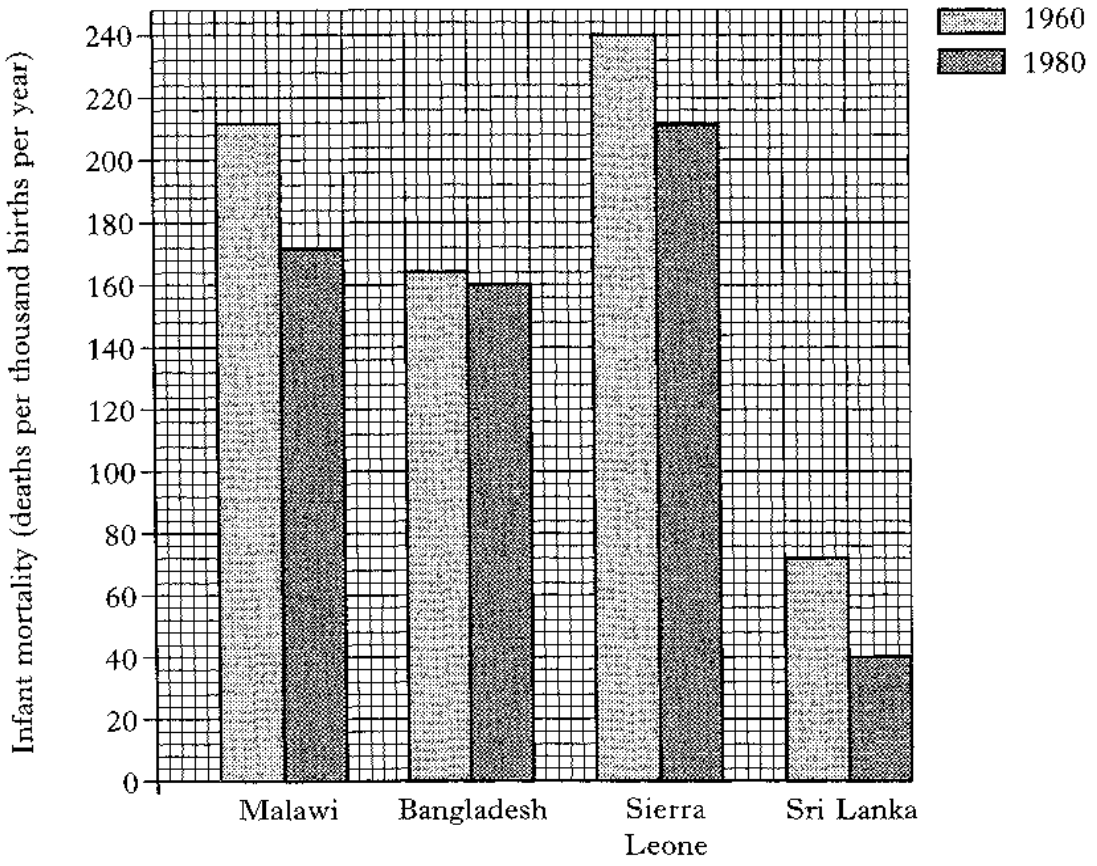
_____

3 _____

_____ **(2)**

write i
mar

14. The graph below shows changes in infant mortality in five countries between 1960 and 1980. *Marks*



(*a*) (i) In which country was there the least change in infant mortality over the twenty year period?

_____ **(1)**

(ii) Suggest a reason why the calculation of infant mortality may be less reliable in a country such as Malawi than in a country such as Scotland.

_____

_____ **(1)**

(*b*) Calculate the percentage decline in infant mortality rate in Sri Lanka over the twenty year period.

Space for calculation

_____ % **(1)**

14. (continued)

Marks

(*c*) Much of the fall in infant mortality in certain countries has been due to the decline of major childhood diseases.

Give an example of such a disease and explain how humans have been able to reduce the impact of this disease.

Disease _____

Explanation _____

_____ **(2)**

(*d*) Name an organisation which is actively involved in the provision of assistance in countries when serious outbreaks of disease occur.

_____ **(1)**

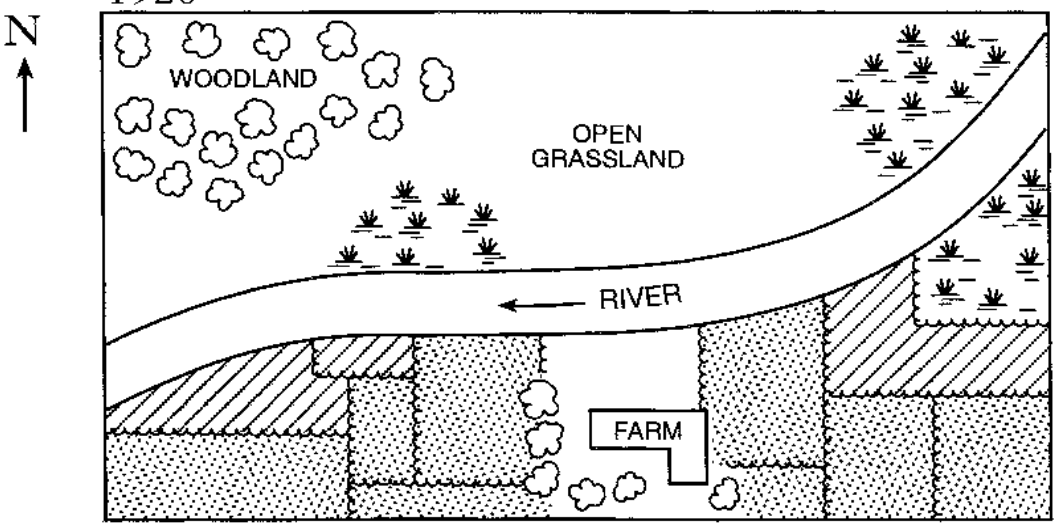
write i
mar

15. The diagrams below show land-use maps of an area as it was in 1920 and as it is today. *Marks*

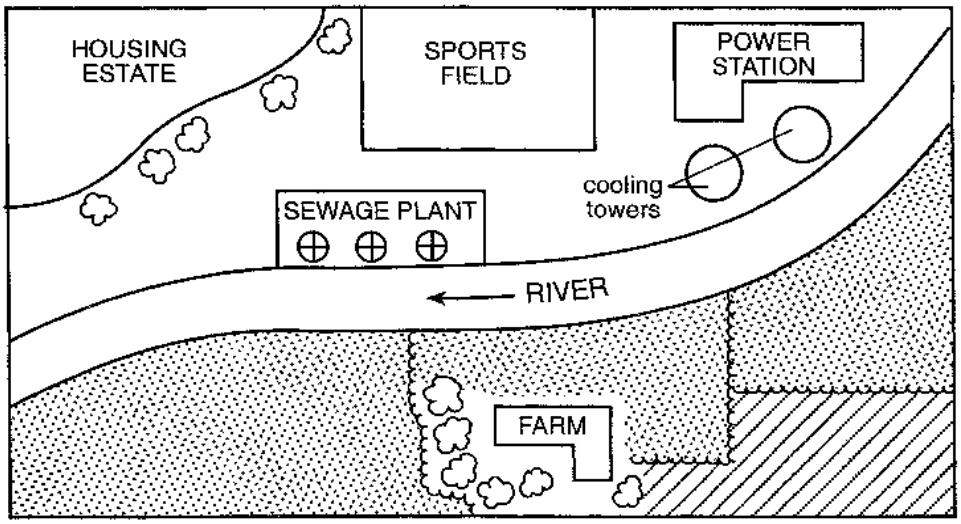
KEY

hedgerow
trees
marsh
grazing land
crops

1920



PRESENT DAY



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marg

15. (continued)

Marks

(*a*) (i) Describe a change in the use of the area which could have resulted in a decrease in oxygen content of the river water.

_____ **(1)**

(ii) Explain how this change results in a decrease in the oxygen content of the river.

_____

_____

_____ **(2)**

(*b*) (i) Describe a change in farming practice, shown on the maps, which has resulted in an increase in food production.

_____ **(1)**

(ii) Suggest another way in which farming practice has improved food production since 1920.

_____

_____ **(1)**

SECTION C

Answer BOTH questions 1 and 2 on the blank pages provided.

You may use labelled diagrams where appropriate.

Marks

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

A. Describe how the process of meiosis brings about variation in the human population, under the following headings:

(i) arrangement of chromosomes; **5**

(ii) exchange of genes. **5**

(10)

OR

B. Describe the functions of the liver, under the following headings:

(i) carbohydrate metabolism; **4**

(ii) protein metabolism. **6**

(10)

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

A. Give an account of the principal causes of infertility in humans. **(10)**

OR

B. Give an account of the different methods by which information is encoded into long term memory. **(10)**

[END OF QUESTION PAPER]

must
write i
marg

SPACE FOR ANSWERS

Marks

must
write i
mar

SPACE FOR ANSWERS

Marks

FOR OFFICIAL USE

Total

Higher Human Biology

Section A
Specimen Question Paper

NATIONAL QUALIFICATIONS

ANSWER SHEET

Full name of school or college

Town

First name and initials

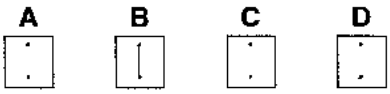
Surname

Date of birth
Day Month Year

Candidate number

Number of seat

Using ink, indicate your choice of answer by a single stroke **joining the two dots** in the box, as in the following example:



	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	A	B	C	D
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

[C009/SQP023]

Higher Human Biology

NATIONAL QUALIFICATIONS

Specimen Marking Instructions

SCOTTISH QUALIFICATIONS

SECTION A

1 mark for each correct response

1 D	**11 A**	**21 B**
2 D	**12 B**	**22 D**
3 B	**13 B**	**23 D**
4 A	**14 B**	**24 D**
5 D	**15 C**	**25 B**
6 C	**16 D**	**26 C**
7 A	**17 A**	**27 D**
8 A	**18 D**	**28 C**
9 B	**19 A**	**29 C**
10 B	**20 C**	**30 D**

SECTION B

1(a) P - mitochondrion - provides ATP for membrane movement
R - lysosome - contains enzymes to digest bacterium
Q - ribosome - synthesis of protein

(b) Phagocytosis

(c) (i) B-lymphocyte
(ii) Its antigens/protein coat
(iii) By vaccination/injection of foreign antigens

2 (a) (i) DNA
(ii) Nucleotide
(iii) Phosphate, adenine, guanine

(b) Its twisted shape/helical structure/hydrogen bonds

(c) (i) Mutation
(ii) It might disrupt a pathway/prevent it working/cause the wrong enzyme to be manufactured

3 (a) Recessive, because Jim and Ann (who are unaffected) have an affected child

(b) Tony - Bb Mary - bb

(c) 50%

4 (a) *H should appear on unpaired portion of X chromosome*

(b) Autosomes

(c) Extra, or missing, chromosomes indicate genetic disorder (such as Down's syndrome)

5. (a) (i) 12 μm (units necessary for mark)

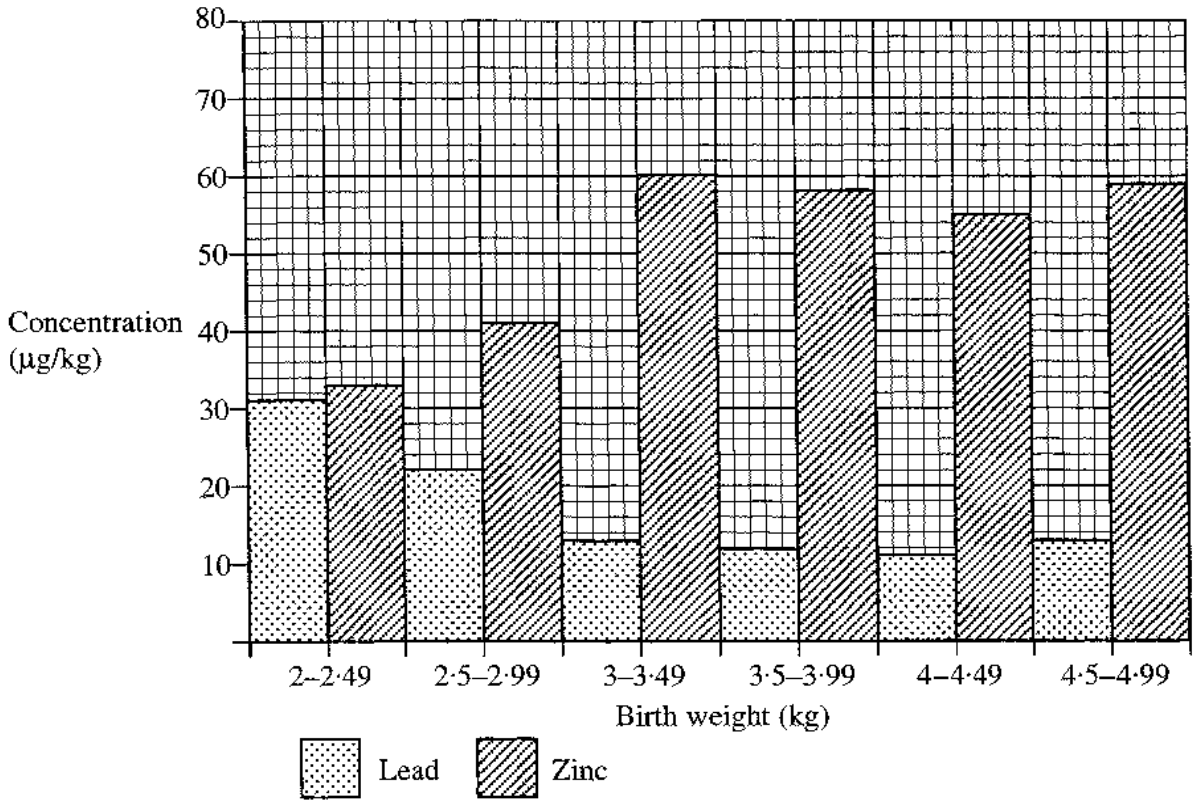
(ii) 1:10

(iii) The ovum contains a large store of food (for the diving zygote)
Sperm is very small to enable easier/quicker movement.

(b) To provide energy for swimming

(c) FSH—stimulates sperm production
LH—stimulates testosterone production

6. (a) *1 mark for x and y axes; 1 mark each for lead/zinc points plotted correctly*



(b) (i) As lead concentration increases, average birth weight drops
As zinc concentration increases, birth weight increases and then is unaffected

(ii) Zinc may act as a cofactor for enzymes/necessary for enzyme to function properly/speeds up enzyme activity

(c) Through contaminated drinking water/lead pipes (1) absorbed into blood (1)
Through air polluted with lead (from car exhausts) (1), breathed into lungs and from there into blood (1) (*any two related parts*)

7. (a) A—oestrogen
B—progesterone

(b) *Any five consecutive boxes within 11 and 17 day period*

(c) Ovulation/egg released
Development of corpus luteum

(d) (i) To permit implantation/attachment of embryo in womb
(ii) It does not deteriorate/it stays in place

8 (a) A - plasma B - lymph C - tissue fluid

(b) decrease, decrease, increase, increase

(c) Fluid is lost from the blood/energy is lost through friction with walls

9 (a) (i) 37·05°C
(ii) Heat is transferred from water to blood in arm/body
(iii) Corrective cooling mechanisms (such as sweating)continued to cool body

(b) (i) Hypothalamus
(ii) Autonomic

10 (a) 10.5 kg and 5.6kg (*units required for mark*)

(b) 98

(c) Bone mass increases between the ages of 20 and 33 years, so decline is by no means uniform

11 (a) It speeds it up

(b) (i) A neurotransmitter
(ii) Neurotransmitter is released from vesicle (1) and diffuses across cleft (1) to stimulate receptors on the other side (1) (*any two*)

(c) (i) Relaxed
(ii) Actin and myosin

12 (a) extinction; generalisation; imitation; discrimination

(b) eg offer of sweets/encouragement/praise for any appropriate behaviour
reward motivates/encourages/persuades child to repeat behaviour

(c) Internalisation

13 (a) (i) *Either box can be ticked, but the appropriate reason must be given to gain the mark*

Agree – insufficient evidence to make any other conclusion
Disagree – maze Q is easier to learn because of its regular (2 left/ 2 right) design.

(ii) Repeat the investigtion with many other students

(b) Maze R has fewer turns to reach the finish
Maze R has regular left/right pattern
Maze R has shorter dead ends/with one less turn
(1 correct – 0 marks 2 correct -1 mark)

14 (a) (i) Bangladesh
(ii) The gathering/registering of statistics is less well organised/communication with outlying districts less well established. *or equivalent.*

(b) 44% (32/72)

(c) eg smallpox, polio, typhoid, diphtheria, TB etc
eg By introduction of vaccination programme/better sanitation/clean drinking water

(d) eg WHO/Red Cross/Oxfam

15 (a) (i) Building of sewage plant/power station
(ii) Sewage/hot water results in increased growth of plants (1)
More organic material is available for bacteria (1) which use up oxygen (1)
(any two)

(b) (i) Reclamation of marshland/increase in size of fields/removal of hedges
(ii) eg use of artificial fertilisers/pesticides/better mechanisation

SECTION C

- one mark for each line up to maximum specified
- underline indicates essential
- (brackets) indicates non-essential
- labelled diagrams are acceptable and can be credited with marks where appropriate
- OR indicates one or other answer gains mark
- no marks for statements in *italics*
- oblique / indicates alternative

1 A (i) Chromosomes exist in matching pairs
Members of each pair originate from male and female parent
Pairs are called homologous pairs/chromosomes
During meiotic division, chromosomes lie alongside their homologous partner
(Homologous pairs) then migrate to equator of cell
They line up randomly/unaffected by the orientation of other pairs
This results in random arrangement of chromosomes

(max 5 marks)

(ii) When homologous chromosomes pair up with one another
they already exist as pairs of identical chromatids
Breaks occur at points called chiasmata on the chromatids
The chromatids rejoin at these points with their opposite chromatid
resulting in the exchange of genes
This is called crossing over
This results in the swapping/exchange of genes which gives variation

(max 5 marks)

B (i) Glucose is stored in the liver as glycogen
Glucose is soluble, glycogen is not
So glycogen does not upset osmotic balance of body fluids
(The hormone) insulin promotes this process
Glucagon promotes the release of glucose from glycogen
Adrenalin promotes the release of glucose from glycogen

(max 4 marks)

(ii) Excess protein cannot be stored in the body
Proteins are composed of amino acids
Excess amino acids are deaminated
Products are turned into (i) urea and
(ii) respired/stored as glycogen
Some proteins are manufactured by liver
eg plasma proteins. OR any single example of protein made by liver
Some amino acids can be converted into other amino acids
This process is called transamination

(max 6 marks)

2 A Infertility is failure of sperm to fertilise an egg/failure of zygote to develop

Infertility can result from:

Males:
insufficient sperm
sperm malformed/malfunctioning
hormonal imbalance
impotence
sperm destroyed by body immune system
(*max 2 marks*)
Females:
blocked fallopian tubes
failure to ovulate
failure to implant
fibroids OR adhesions
hormone imbalance
ovary/oviduct/uterus malfunction
(*max 4 marks*)

Plus environmental factors such as:

obesity
smoking
alcohol
drugs
scarring from surgery
wearing of tight clothing (males)
pollution eg (ionising) radiation
disease eg sexually transmitted diseases/cancer
(*max 2 marks*)
(Max overall 8 marks)

B Three stages in memorising information: encoding, storage and retrieval
Encoding is turning something into a form which can be memorised
Information can be encoded as sounds - acoustic
any reasonable example: eg saying over a phrase or number to aid memory
Information can be encoded as pictures - visual
any reasonable example: eg having a mental picture of someone's face
Information can be encoded using meaning - semantic
any reasonable example: eg remembering the story of a film or book
Encoding can be aided by (mnemonics) - memory aids
any reasonable example of a mnemonic: eg ROY G BIV
Encoding can be aided by repetition over a period of time
any reasonable example: eg revision of work for examinations
Encoding can be aided by organisation of material (into logical groups)
any reasonable example: eg using alphabetic organisation of names
(*max 8 marks*)

2 (continued)

In addition :

Coherence

Is the writing organised under sub headings or divided into paragraphs?

Is related information grouped together ?

Is there evidence of a logical progression in the account or description?

Any two = 1 mark
One or less = 0 mark

Relevance

If the candidate has included two or more pieces of information that do not relate to the question then 0 marks are awarded. Otherwise 1 mark should be awarded.

[END OF MARKING INSTRUCTIONS]