



National
Qualifications
SPECIMEN ONLY

S807/76/12

Biology
Paper 1 — Multiple choice

Date — Not applicable

Duration — 40 minutes

Total marks — 25

Attempt ALL questions.

You may use a calculator.

Instructions for the completion of Paper 1 are given on *page 02* of your answer booklet S807/76/02.

Record your answers on the answer grid on *page 03* of your answer booklet.

Space for rough work is provided at the end of this booklet.

Before leaving the examination room you must give your answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.



* S 8 0 7 7 6 1 2 *

Total marks — 25
Attempt ALL questions

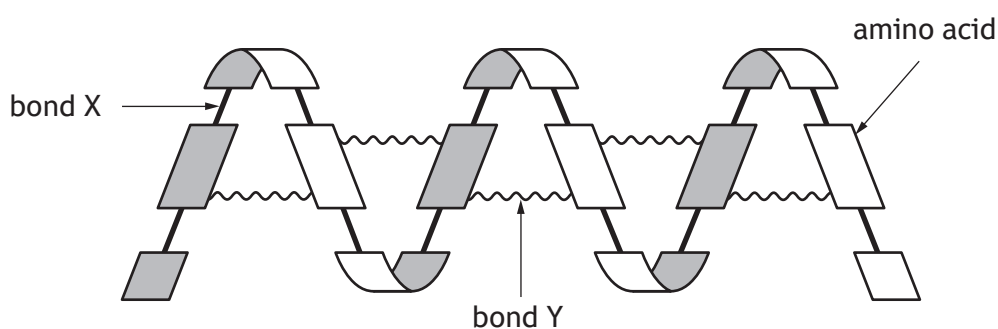
1. The genetic material in human mitochondria is arranged as

- A linear chromosomes
- B circular plasmids
- C circular chromosomes
- D inner membranes.

2. The main components of a ribosome are

- A mRNA and tRNA
- B rRNA and proteins
- C mRNA and proteins
- D rRNA and mRNA.

3. The diagram represents part of a protein molecule.



Which row in the table identifies bonds X and Y?

	Bond X	Bond Y
A	hydrogen	peptide
B	hydrogen	hydrogen
C	peptide	hydrogen
D	peptide	peptide

4. Which row in the table describes research and therapeutic uses of stem cells?

	Research use	Therapeutic use
A	to repair damaged tissue	to study how diseases develop
B	to test drugs	to provide information on cell differentiation
C	to study how diseases develop	to repair damaged tissue
D	to provide information on cell differentiation	to test drugs

5. Types of single gene mutation are given in the list.

- 1 substitution
- 2 insertion
- 3 deletion

Which of these could affect only one amino acid in the polypeptide produced?

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

6. Which row in the table describes meristems?

	Found in	Type of cell present
A	animal	specialised
B	animal	unspecialised
C	plant	specialised
D	plant	unspecialised

[Turn over

7. The statements refer to DNA sequences in the chromosomes of eukaryotic species.
- 1 code for protein
 - 2 regulate transcription
 - 3 are transcribed but not translated

Which statements describe the DNA sequences which make up the genome?

- A 1 only
 - B 1 and 2 only
 - C 1 and 3 only
 - D 1, 2 and 3
8. The table contains information about the relative genome sizes and number of genes found in a variety of organisms.

Organism	Size of genome (million base pairs)	Number of genes
Human	3080	30 000
Mouse	2600	25 307
Fruit fly	120	13 601
Yeast	12	6294
Mosquito	278	13 688
Nematode worm	97	19 873
Thale cress	125	25 000

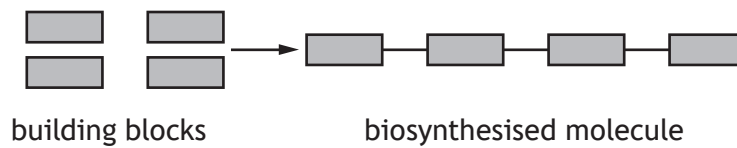
What conclusion can be drawn from the data in the table?

- A The larger the genome, the fewer genes it contains.
 - B There is no relationship between genome size and number of genes.
 - C The larger the genome, the more genes it contains.
 - D The smaller the genome, the more genes it contains.
9. When comparing genomic sequence data, bioinformatics is the use of
- A statistical analysis and fossil evidence
 - B fossil evidence and computer analysis
 - C computer analysis and pharmacogenetics
 - D computer analysis and statistical analysis.

10. Cell membranes contain pumps that actively transport substances.
Which of the following forms the major component of membrane pumps?

- A Protein
- B Phospholipid
- C Nucleic acid
- D Cellulose

11. The diagram shows how a molecule might be biosynthesised from building blocks in a metabolic pathway.



Which row in the table describes the metabolic process shown in the diagram and the energy relationship involved in the reaction?

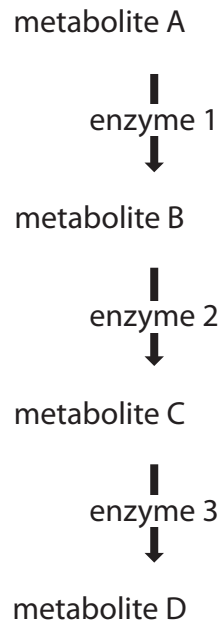
	Metabolic process	Energy relationship
A	anabolic	energy used
B	anabolic	energy released
C	catabolic	energy used
D	catabolic	energy released

12. An inhibitor of an enzyme-catalysed reaction can be described as competitive if

- A its effect can be reversed by increasing substrate concentration
- B it is the end-product in a metabolic pathway
- C it prevents the gene encoding the enzyme from being switched on
- D it changes the shape of the active site.

[Turn over

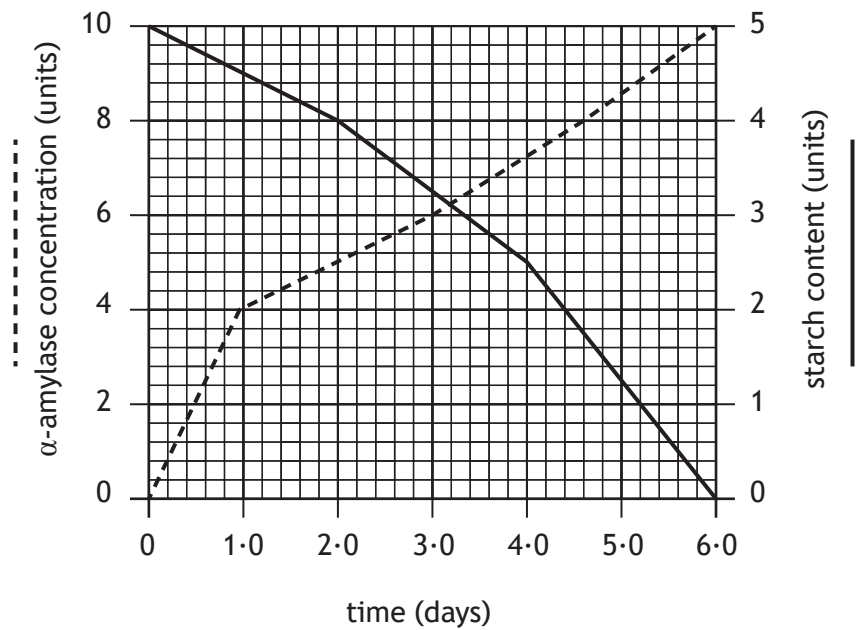
13. The stages of an enzyme-catalysed metabolic pathway are shown.



In feedback inhibition

- A enzyme 3 binds with enzyme 1
- B enzyme 3 binds with metabolite A
- C metabolite D binds with enzyme 1
- D metabolite D binds with metabolite A.

14. The graph shows changes in the α -amylase concentration and the starch content of a barley grain during early growth and development.

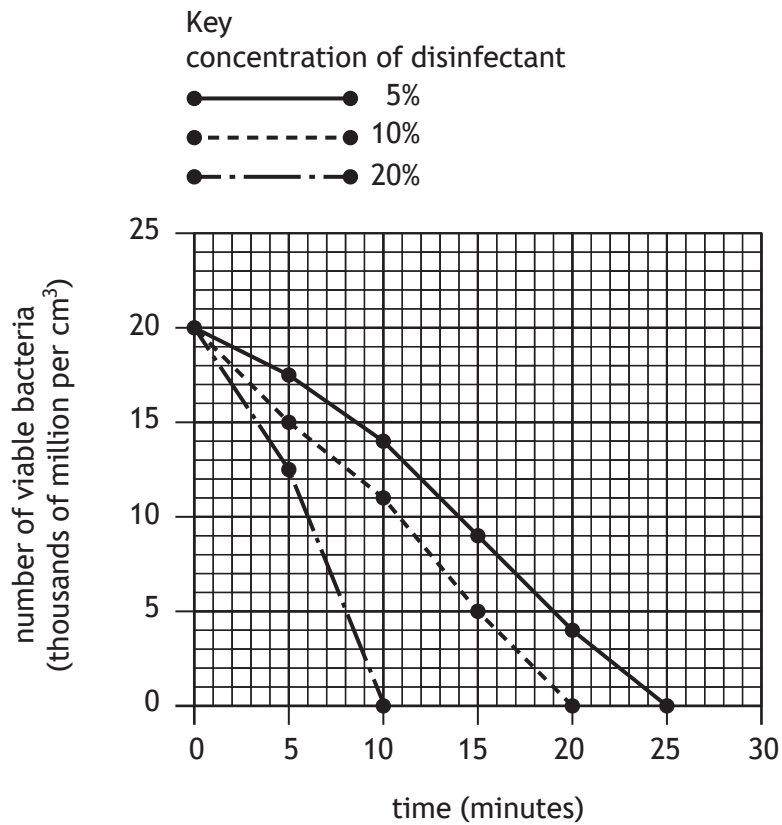


Identify the time by which the starch content of the barley grains had decreased by 50%.

- A 2.0 days
 - B 3.2 days
 - C 4.0 days
 - D 6.0 days
15. Which of the statements describes a behaviour used to avoid adverse conditions?
- A Ruby throated hummingbirds enter a state of torpor every night.
 - B Humpback whales swim from Alaska to Hawaii prior to the onset of winter.
 - C European hedgehogs reduce their metabolic rate as a result of low temperatures.
 - D Muzzer crocodiles become dormant due to drought conditions.

[Turn over

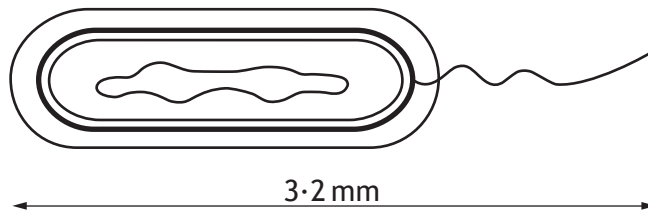
16. The graph shows the effect of different concentrations of a disinfectant on the number of viable bacteria in liquid culture.



What percentage of bacteria was killed by 20% concentration of disinfectant after 5 minutes?

- A 25
- B 37.5
- C 62.5
- D 75

17. The diagram shows a bacterial cell that has been magnified 800 times.



The length of the cell in micrometres (μm) is

- A 0.004
- B 0.04
- C 0.4
- D 4.0

18. In which of the following domains of life are microorganisms found?

- A Bacteria only
- B Archaea only
- C Bacteria and archaea only
- D Bacteria, archaea and eukaryotes

19. A field trial was set up to investigate the effect of mass of fertiliser applied and the application of fungicide on growth of barley.

The diagram shows the distribution of plots in the field and the treatments applied.

30	30	50
30	10	30
50	50	10
10	50	30
10	30	10
50	10	50

Key



Fungicide applied



No fungicide applied

10 10 kg fertiliser applied per hectare

30 30 kg fertiliser applied per hectare

50 50 kg fertiliser applied per hectare

Which design feature was included to eliminate bias?

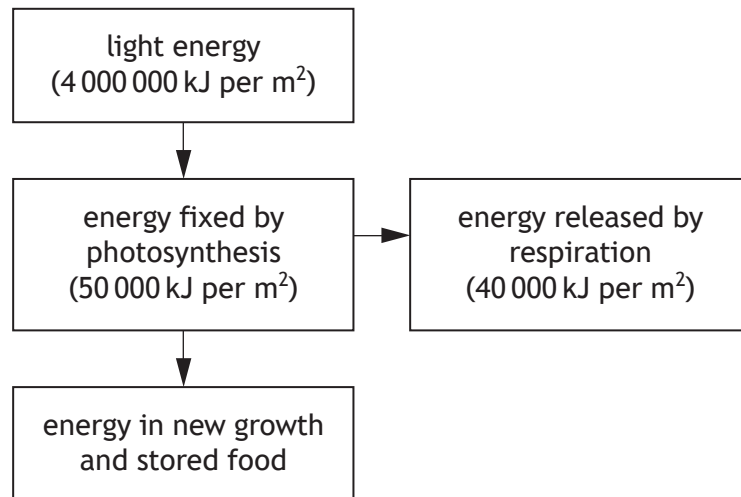
- A Application of fungicide to half of the plots
- B Randomisation of treatments
- C Application of three different masses of fertiliser
- D Use of three replicates

20. An action spectrum is a measure of the ability of a plant to

- A absorb all wavelengths of light
- B absorb light of different intensities
- C use light to build up food
- D use light of different wavelengths for photosynthesis.

[Turn over

21. The flow chart shows the energy flow in a field of potatoes during one year.



What is the percentage of the available light energy present in new growth and stored food in the potato crop?

- A 0.25
- B 1.00
- C 1.25
- D 2.25

22. The list describes observed behaviour of pigs on a farm.

- 1 Stereotypic flicking of the head
- 2 Repeated wounding of other pigs by biting
- 3 Lying in a position which does not allow suckling

Which of these behaviours indicate poor animal welfare?

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

23. Adult beef tapeworms live in the intestine of humans. Segments of the adult worm are released in the faeces. Embryos that develop from them remain viable for five months. The embryos may be eaten by cattle and develop in their muscle tissue.

Which row in the table identifies the roles of the human, tapeworm embryo and cattle?

	Role		
	Human	Tapeworm embryo	Cattle
A	host	resistant stage	secondary host
B	host	vector	secondary host
C	secondary host	vector	host
D	secondary host	resistant stage	vector

24. The following statements describe symbiotic relationships between organisms.

- 1 Rhinos allow oxpecker birds to eat the parasitic ticks which live on their skin.
- 2 Spider crabs provide a habitat for algae which grow on them camouflaging the crabs from predators.
- 3 Female *Anopheles* mosquitoes feed on human blood from which they gain nutrients needed for the production of their eggs.

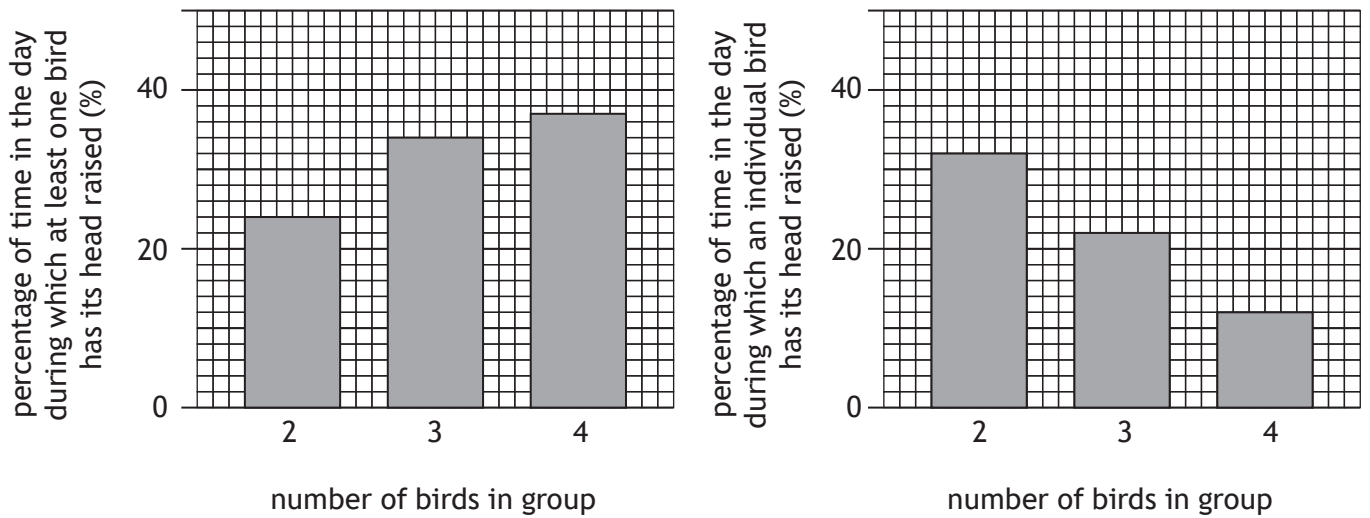
Which of these relationships can be described as mutualistic?

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

[Turn over

25. Ostriches are large birds that live on open plains in Africa. They divide their time between feeding on vegetation and raising their heads to look for predators.

The graphs show the results of a study on the effect of group size in ostriches on their behaviour.



Which of the following is a valid conclusion from these results?

In larger groups, an individual ostrich spends

- A less time with its head raised so the group is less likely to see predators
- B less time with its head raised but the group is more likely to see predators
- C more time with its head raised so the group is more likely to see predators
- D more time with its head raised but the group is less likely to see predators.

[END OF SPECIMEN QUESTION PAPER]

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

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Mark

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S807/76/02

**Biology
Paper 1 — Multiple choice
Answer booklet**

Date — Not applicable

Duration — 40 minutes



* S 8 0 7 7 6 0 2 *

Fill in these boxes and read what is printed below.

Full name of centre

--

Town

--

Forename(s)

--

Surname

--

Number of seat

--

Date of birth

Day

--	--

Month

--	--

Year

--	--

Scottish candidate number

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Instructions for the completion of Paper 1 are given on *page 02*.

Record your answers on the answer grid on *page 03*.

You may use a calculator.

Use **blue** or **black** ink.

Before leaving the examination room you must give your answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.



* S 8 0 7 7 6 0 2 0 1 *



The questions for Paper 1 are contained in the question paper S807/76/12.

Read these and record your answers on the answer grid on *page 03*.

Use **blue** or **black** ink. Do NOT use gel pens or pencil.

1. The answer to each question is **either** A, B, C or D. Decide what your answer is, then fill in the appropriate bubble (see sample question below).
2. There is **only one correct** answer to each question.
3. Any rough working should be done on the space for rough work at the end of the question paper S807/76/12.

Sample question

The thigh bone is called the

- A humerus
- B femur
- C tibia
- D fibula.

The correct answer is **B** — femur. The answer **B** bubble has been clearly filled in (see below).

A	B	C	D
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Changing an answer

If you decide to change your answer, cancel your first answer by putting a cross through it (see below) and fill in the answer you want. The answer below has been changed to **D**.

A	B	C	D
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you then decide to change back to an answer you have already scored out, put a tick (✓) to the **right** of the answer you want, as shown below:

A	B	C	D	or	A	B	C	D
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>





	A	B	C	D
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





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**Biology
Paper 1 — Multiple choice**

Marking Instructions

These marking instructions have been provided to show how SQA would mark this specimen question paper.

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Marking instructions for each question

Question	Response	Mark
1.	C	1
2.	B	1
3.	C	1
4.	C	1
5.	A	1
6.	D	1
7.	D	1
8.	B	1
9.	D	1
10.	A	1
11.	A	1
12.	A	1
13.	C	1
14.	C	1
15.	B	1
16.	B	1
17.	D	1
18.	D	1
19.	B	1
20.	D	1
21.	A	1
22.	D	1
23.	A	1
24.	C	1
25.	B	1

[END OF SPECIMEN MARKING INSTRUCTIONS]