N5

National
Qualifications
2019

X807/75/02

**Biology
Section 1 — Questions**

TUESDAY, 30 APRIL

INSTRUCTIONS TO CANDIDATES

Candidates should enter their surname, forename(s), date of birth, Scottish candidate number and the name and Level of the subject at the top of their first answer sheet.

Instructions for the completon of Section 1 are given below.

Section 1 — 20 marks

Attempt ALL questions.

See *page 02* of your question booklet X807/75/01.

Questions marked with an asterisk differ in some respect from those in the printed paper.

An OW in the margin indicates a new question.

SQA ©

1. Animal cells left in a solution with a lower water concentration than their contents

    A   shrink

    B   burst

    C   become turgid

    D   become plasmolysed.

* 2. Refer to the diagram for Question 2. The diagram represents a typical plant cell.

    Which of the labelled parts could also be found in a typical fungal cell?

    A   L and M

    B   K and M

    C   K and L

    D   K, L and M

* 3. Refer to the diagram for Question 3. The diagram shows stages in the production of a protein in a cell.

    Which row in the table identifies the exact location of each stage?

	Stage 1	Stage 2
A	nucleus	cytoplasm
B	nucleus	ribosome
C	cytoplasm	ribosome
D	cytoplasm	nucleus

4. A single strand of DNA contains 830 adenine, 929 cytosine, 774 guanine and 615 thymine bases.

    How many guanine bases would be in the complementary strand?

    A   615

    B   774

    C   830

    D   929

* **5.** Refer to the diagram for Question 5. Proteins are broken down in the stomach into polypeptides.

The graph shows the concentration of proteins and polypeptides in the stomach over 90 minutes.

The ratio of protein concentration to polypeptide concentration in the stomach after 30 minutes is

A   2:3

B   3:2

C   3:7

D   7:3

* **6.** Four flasks, J, K, L and M are connected together by tubing.
  * Flask J is half filled with sodium hydroxide to absorb carbon dioxide
  * Flask K is half filled with limewater
  * Flask L contains 5 worms
  * Flask M is half filled with limewater

Air is drawn through the connected flasks from J to M, first bubbling through the sodium hydroxide in Flask J, then through the limewater in Flask K. The air then passes to Flask L, then bubbles out through the limewater in Flask M.

Limewater turns increasingly cloudy as more carbon dioxide is passed through it.

Predict what would happen if only one worm was used in flask L.

The limewater in flask

A   K would turn cloudy more slowly

B   K would turn cloudy more quickly

C   M would turn cloudy more slowly

D   M would turn cloudy more quickly.

7. Which of the following reactions takes place during fermentation in plant cells?

A   pyruvate $\longrightarrow$ carbon dioxide + ethanol

B   glucose $\longrightarrow$ carbon dioxide + water

C   glucose $\longrightarrow$ water + ethanol

D   pyruvate $\longrightarrow$ lactate

8. A cell with 10 chromosomes divided by mitosis.

Which row in the table identifies the number of daughter cells produced and the number of chromosomes in each daughter cell?

	Number of daughter cells produced	Number of chromosomes in each daughter cell
A	1	20
B	1	5
C	2	10
D	2	5

9. Which row in the table shows the type of message that is transferred through various structures in a reflex arc?

	Sensory neuron	Synapse	Motor neuron
A	chemical	electrical	chemical
B	electrical	chemical	electrical
C	chemical	chemical	electrical
D	electrical	electrical	chemical

10. Hormones are released by

A   endocrine glands

B   blood cells

C   receptor cells

D   target tissues.

*11. Refer to the diagram for Question 11. The volume of one bird's testis was measured on the last day of each month for a year.

The graph shows the results.

Which of the following statements is true?

The volume of the testis

A   is constant from end of November to end of February

B   increases more between end of March and end of April than any other month

C   increases for only five months of the year

D   decreases for only four months of the year.

12. Which term describes the type of variation in which a characteristic is controlled by more than one gene?

A   Continuous

B   Discrete

C   Polygenic

D   Heterozygous

*13. Refer to the diagram for Question 13. Albinism is a condition in which the production of a pigment that colours the skin is limited. It is controlled by a recessive allele.

The diagram shows how a family was affected by the condition.

The chance of this couple's 3rd child being affected by the condition is

A   1 in 1

B   1 in 2

C   1 in 3

D   1 in 4.

14. Which row in the table describes features of phloem?

	Substance transported	Sieve plates
A	sugar	present
B	sugar	absent
C	water	absent
D	water	present

*15. Refer to the diagram for Question 15. The diagram shows a mammalian heart and associated blood vessels.

Which row in the table identifies blood vessel X and chamber Y?

	Blood vessel X	Chamber Y
A	pulmonary artery	left atrium
B	pulmonary vein	right atrium
C	pulmonary artery	right atrium
D	pulmonary vein	left atrium

16. The table shows the composition of some of the gases in inhaled and exhaled air.

Gas	Gas composition (%)	
	Inhaled air	Exhaled air
Oxygen	20	16
Carbon dioxide	0·04	4

How many times greater is the carbon dioxide concentration in exhaled air than in inhaled air?

A   0·16

B   3·96

C   100

D   500

*17. Refer to the diagram for Question 17. The graph shows survey results of estimated grey seal pup populations every two years from 2010 to 2016.

If the grey seal pup population continues to increase by the same number at each survey, what will the estimated population be in 2020?

A   50 500

B   52 000

C   53 500

D   55 000

18. Competition occurs when required resources are in short supply.

Interspecific competition occurs when individuals of

A   the same species compete for a few of the same resources

B   different species compete for a few of the same resources

C   the same species compete for all the same resources

D   different species compete for all the same resources.

19. At six different sample sites in a stream, the oxygen concentration, pH and numbers of different organisms were recorded.

The higher the number of organisms in the sample the more abundant they are.

The results are shown in the tables.

Table 1

Factor	Sample site					
	1	2	3	4	5	6
Oxygen concentration (units)	88	80	75	72	28	61
pH	5·7	6·0	6·6	7·3	7·6	8·0

Table 2

Organism	Sample site					
	1	2	3	4	5	6
Mayfly nymphs	0	0	0	5	7	122
Dragonfly nymphs	3	3	2	3	2	2
Chironimid fly larvae	0	1	1	2	227	32
Freshwater snails	0	0	0	0	50	75

Using the results from both tables identify which of the following conclusions is **false**.

A   Fresh water snails do not survive in water with a lower pH

B   Changes in pH have little effect on the distribution of dragonfly nymphs

C   Mayfly nymphs are at their most abundant when the oxygen concentration is lowest

D   Chironimid fly larvae are at their most abundant when the oxygen concentration is lowest

20. In which parts of a green leaf would most photosynthesis occur?

A   Palisade mesophyll and lower epidermis

B   Lower epidermis and guard cells

C   Guard cells and spongy mesophyll

D   Spongy mesophyll and palisade mesophyll

21. The table shows the rate of photosynthesis in a plant under different light intensities.

Light intensity (kilolux)	Rate of photosynthesis (units)
10	2
20	28
30	53
40	76
50	85

Which change in light intensity produces the greatest increase in the rate of photosynthesis?

A   10 to 20 kilolux

B   20 to 30 kilolux

C   30 to 40 kilolux

D   40 to 50 kilolux

22. A gardener decided to treat his crops with both fertiliser and pesticides.
The result of this would be

A   a decrease in soil nitrates and an increase in crop yield

B   an increase in soil nitrates and an increase in crop yield

C   an increase in soil nitrates and a decrease in crop yield

D   a decrease in soil nitrates and a decrease in crop yield.

23. Which of the following could occur as a result of fertiliser leaching into a fresh water pond?

	Algae population	Bacterial population	Oxygen concentration
A	increases	increases	increases
B	decreases	decreases	decreases
C	decreases	decreases	increases
D	increases	increases	decreases

24. For the successful biological control of whitefly in a greenhouse, it was recommended to use 50 individuals of a predator species to kill a population of 1500 whitefly.

The number of predators that would be required to kill 21 000 whitefly is

A   420

B   700

C   19 500

D   75 000.

25. Which of the following statements describe the possible effects of a mutation on the survival of an organism?

1.   It has no effect

2.   It gives the organism an advantage

3.   It disadvantages the organism

A   1 and 2 only

B   1 and 3 only

C   2 and 3 only

D   1, 2 and 3

[END OF SECTION 1. NOW ATTEMPT THE QUESTIONS IN SECTION 2 OF YOUR QUESTION AND ANSWER BOOKLET.]