National Qualifications 2025

X807/75/02

Biology
Section 1 — Questions

TUESDAY, 27 MAY

1:30 PM – 4:00 PM

Instructions for the completion of Section 1 are given on *page 02* of your question and answer booklet X807/75/01.

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

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

SQA ©

SECTION 1 — 25 marks

Attempt ALL questions

1. Which of the following structures would **not** be found in a typical plant cell?

A Chloroplast

B Cell membrane

C Plasmid

D Mitochondrion

2. Potato cylinders were placed into different concentrations of sucrose solution and any change in mass was recorded.

The table shows the initial sucrose concentrations inside the potato cells and the concentrations of the solutions they were placed in.

Which potato cylinder will gain the most mass?

	Initial sucrose concentration inside potato cells (mol/dm^3)	**Sucrose concentration of solution (mol/dm^3)**
A	0.31	0.45
B	0.35	0.35
C	0.31	0.25
D	0.35	0.21

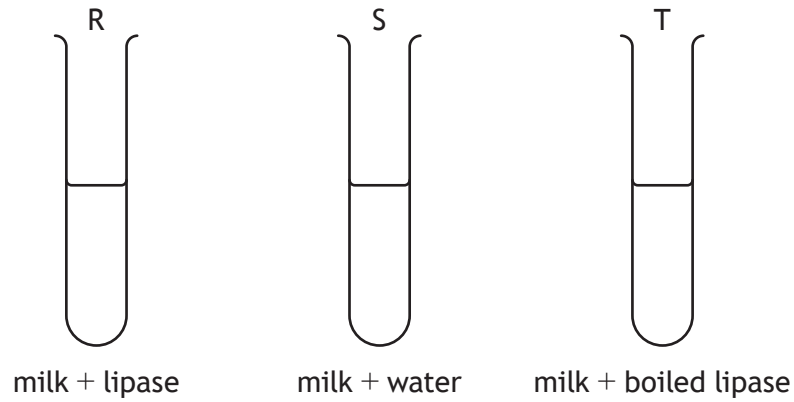
3. In a section of DNA, 34% of the bases are thymine.

Which row in the table shows the percentages of the other bases in this section of DNA?

	Adenine	**Cytosine**	**Guanine**
A	16	34	34
B	34	34	16
C	34	16	16
D	16	16	34

4. Lipase is an enzyme that speeds up the breakdown of fats, producing an acid that decreases the pH.

Three test tubes were set up to investigate the action of lipase on fat in milk.



The pH of each test tube was recorded at the start of the experiment and then again 20 minutes later.

In which of the test tube(s) would the pH stay the same?

A R only

B T only

C R and T

D S and T

5. A 100 g sample of haemoglobin was found to contain 15 g of leucine.

What mass of leucine would be found in a 5 g sample of haemoglobin?

A 0.15

B 0.75

C 20.0

D 75.0

6. A culture of 350 bacterial cells was genetically engineered to produce a human protein.

Only 210 cells successfully produced the protein.

The percentage success was

A 40

B 60

C 67

D 140.

[Turn over

7. Which of the following builds up in animal cells as a result of fermentation?

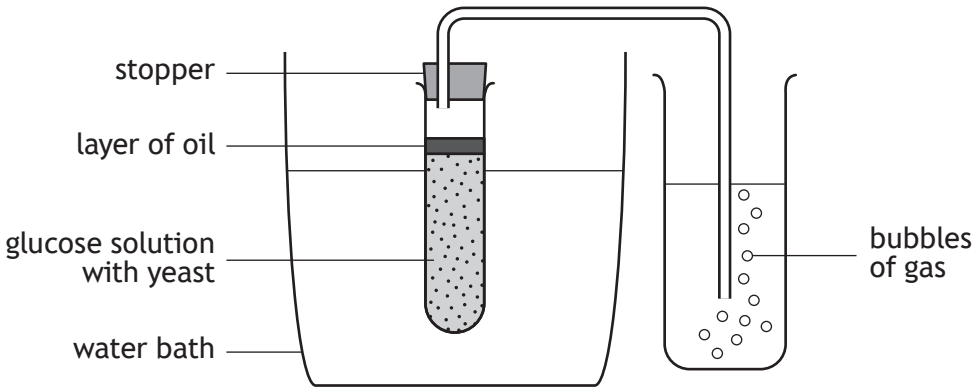
A Lactate

B Ethanol

C Glucose

D Carbon dioxide

8. The apparatus shown was set up to investigate the effect of temperature on fermentation in yeast.



The investigation was carried out at 15 °C and repeated at 20 °C and 30 °C. The number of gas bubbles produced was counted.

Which two variables should be kept constant during the investigation?

A Temperature and time left for

B Type of yeast and time left for

C Temperature and carbon dioxide concentration

D Type of yeast and carbon dioxide concentration

9. During mitosis, which of the following occurs immediately before the cytoplasm divides?

A Nuclear membranes form.

B Chromosomes line up at the equator.

C Pairs of chromatids are separated.

D Chromosomes shorten and thicken.

10. The function of an inter neuron is to carry electrical impulses from

A a motor neuron to a sensory neuron

B an effector to a sensory neuron

C a sensory neuron to a motor neuron

D a motor neuron to an effector.

11. Which row in the table identifies features of the hormone glucagon?

	Site of production	Target organ	Effect
A	pancreas	liver	glycogen → glucose
B	liver	pancreas	glycogen → glucose
C	pancreas	liver	glucose → glycogen
D	liver	pancreas	glucose → glycogen

12. The table shows the number of people recorded as having diabetes in Scotland over a 5-year period.

Year	Number of people with diabetes
1	278 000
2	284 000
3	291 000
4	298 000
5	304 000

Predict the number of people likely to have diabetes in year 10 if the average yearly increase continues.

A 330 000

B 336 500

C 582 000

D 608 000

[Turn over

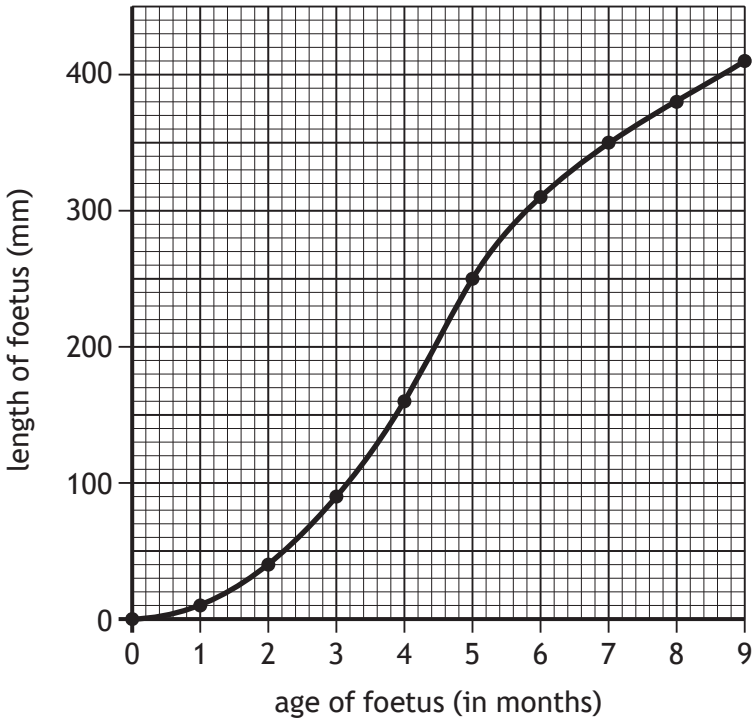
13. The table gives data on the number of eggs produced and the percentage of eggs surviving to adulthood in three different organisms.

Organism	Number of eggs produced	Number surviving to adulthood	Percentage of eggs surviving to adulthood
Brown trout	3000	270	9
Salmon	2000	150	7.5
Common frog		23	5

The number of eggs produced by the common frog was

A 28
B 115
C 437
D 460.

14. The graph shows the growth of a foetus.



The average monthly increase in the length of the foetus from month 5 to month 9 is

A 32 mm
B 40 mm
C 160 mm
D 340 mm.

15. In guinea pigs, short coat is dominant to long coat.

A group of heterozygous guinea pigs were crossed and a total of 72 offspring were produced.

Identify how many of the offspring would be expected to have short coats.

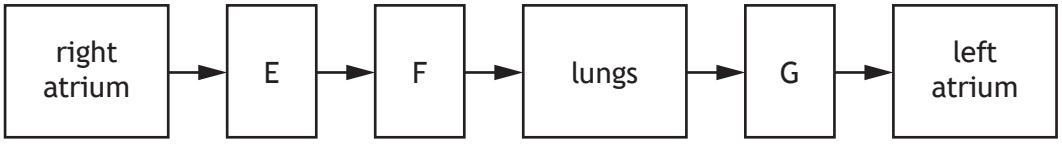
A 18

B 36

C 54

D 72

16. The following sequence shows part of the blood flow through the body.



Which row in the table identifies E, F and G?

	E	F	G
A	right ventricle	pulmonary artery	pulmonary vein
B	right ventricle	pulmonary vein	pulmonary artery
C	pulmonary artery	right ventricle	pulmonary vein
D	pulmonary vein	right ventricle	pulmonary artery

17. Three students carried out an investigation into the effect of exercise on heart rate.

Each student measured their heart rate after completing the same exercises.

After each student's heart rate returned to its resting rate, they repeated the investigation.

Which of the following would improve the reliability of the results?

A Increasing the rest period before repeating the exercise.

B Completing the exercise in a different location.

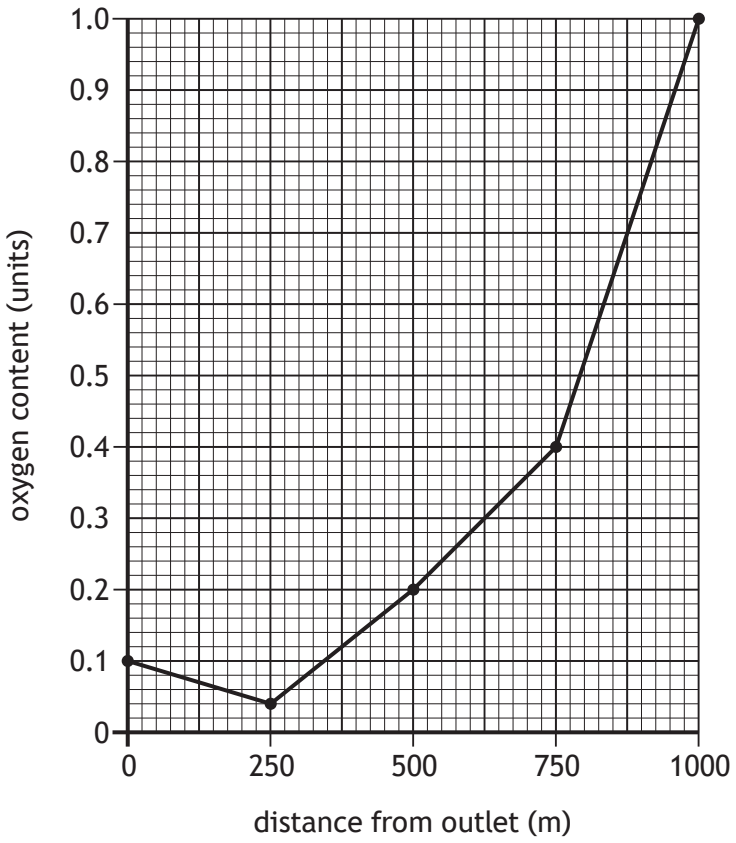
C Changing the type of exercise each time.

D Increasing the number of students exercising.

[Turn over

18. Samples of water were taken from a river at a sewage outlet and at a number of points downstream.

The graph shows the oxygen content of the water at different distances downstream from the outlet.



What is the percentage increase in the oxygen content from 250 m to 1000 m from the outlet?

A 24

B 96

C 2400

D 4900

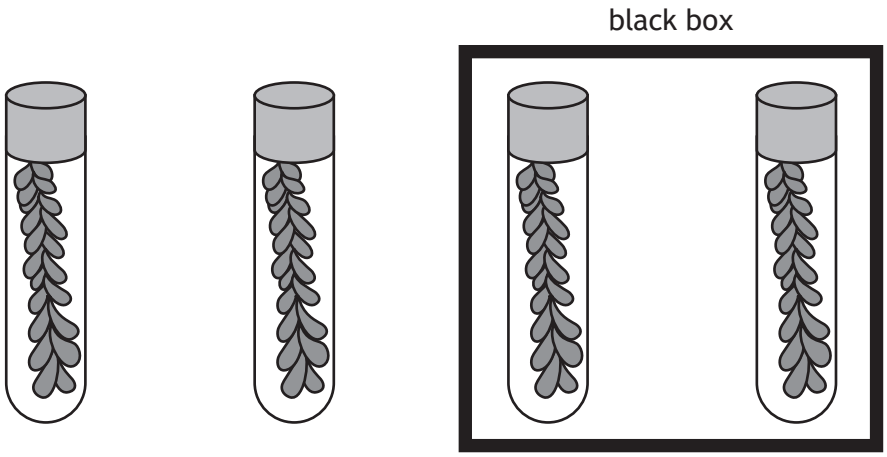
19. Seals and dolphins compete for food.

Which row in the table describes the interaction between these organisms?

	Type of competition	Type of factor
A	intraspecific	biotic
B	intraspecific	abiotic
C	interspecific	biotic
D	interspecific	abiotic

20. The diagram shows an experiment used to investigate the conditions needed for photosynthesis.

All four tubes contained pondweed and water.



Tube:	1	2	3	4
Condition:	light	light	dark	dark
Carbon dioxide concentration:	0.03%	0.3%	0.03%	0.3%

Which two tubes should be compared to show the effect of light on photosynthesis?

A 1 and 2

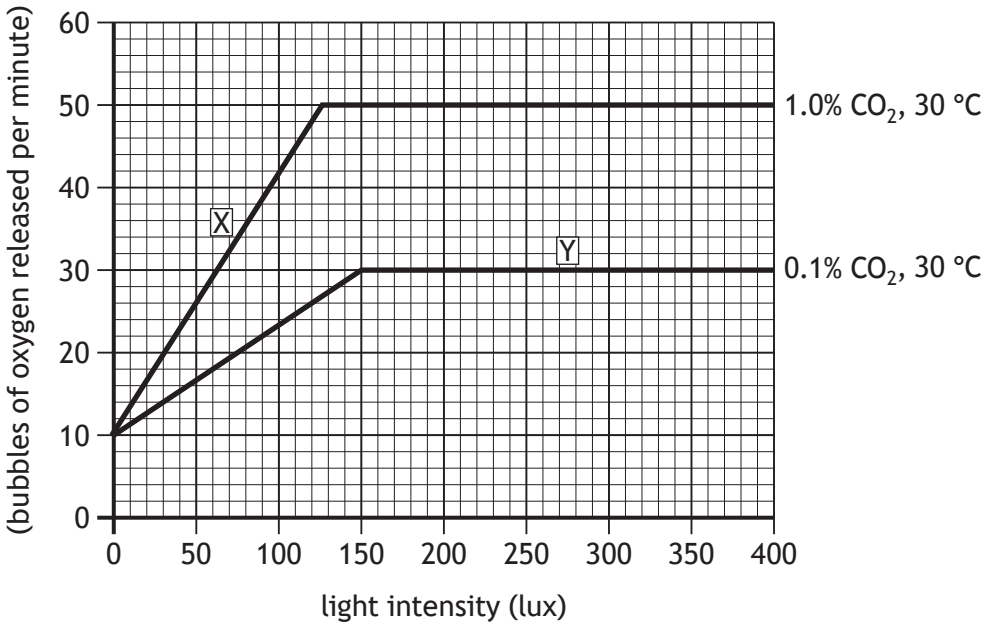
B 1 and 4

C 2 and 3

D 2 and 4

[Turn over

21. The graph shows the effect of limiting factors on the rate of photosynthesis.



Which row in the table identifies the limiting factors at points X and Y on the graph?

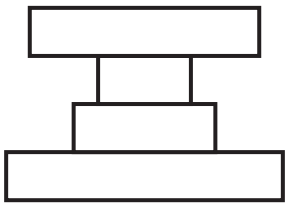
	X	Y
A	light intensity	temperature
B	light intensity	CO_2 concentration
C	temperature	light intensity
D	CO_2 concentration	light intensity

22. The diagrams represent pyramids of numbers.

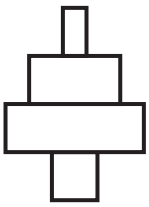
Which pyramid represents the following food chain?

grass ⟶ rabbit ⟶ fox ⟶ fleas

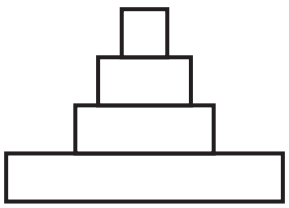
A



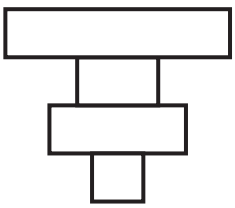
B



C

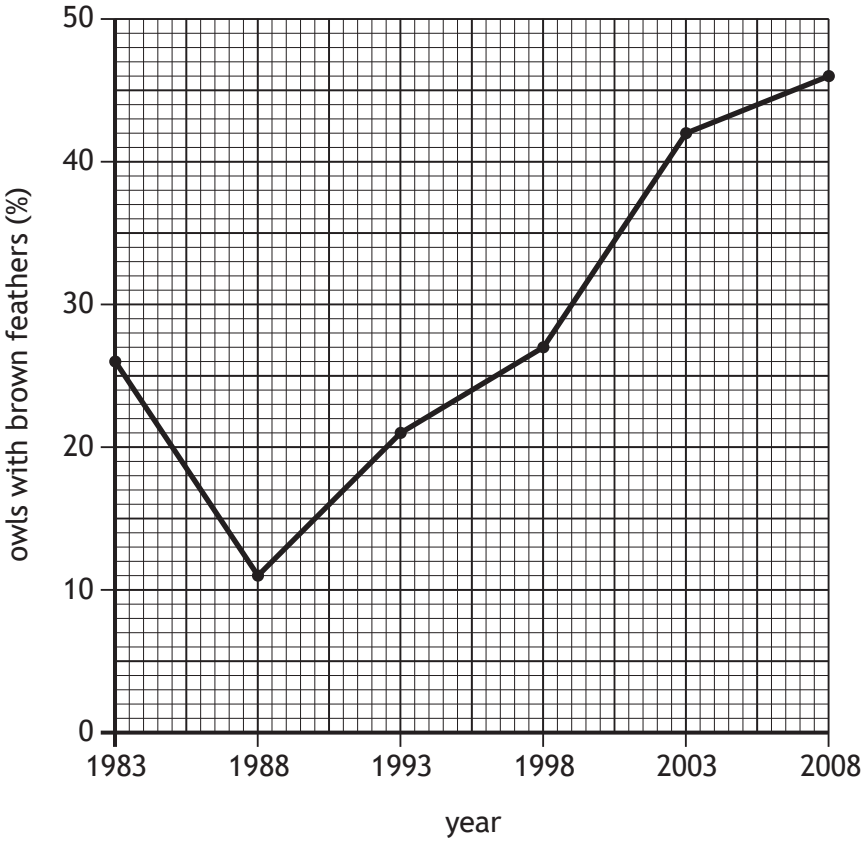


D



23. Researchers investigated natural selection in a population of owls.

The graph shows changes to the percentage of owls with brown feathers over time.



Which of the following statements is correct?

The percentage of owls with brown feathers

A doubles between 1993 and 2003

B increases continually between 1983 and 2008

C increases more between 1988 and 1993 than in any other 5-year period

D increases less between 1993 and 1998 than between 2003 and 2008.

24. Nematode worms are used by farmers to prey upon insects that damage their crops.

This method used to increase crop yield is an example of

A genetic modification

B biological control

C pesticide use

D fertiliser use.

[Turn over

25. The number of light and dark peppered moths in a woodland were counted over a 5-year period.

The results are shown in the table.

Year	Average number of light variety moths	Average number of dark variety moths
1	200	60
2	180	100
3	140	160
4	120	180
5	100	200

The percentage of moths counted in year 4 that were the dark variety was

A 20%

B 40%

C 50%

D 60%.

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