National Qualifications

X807/75/02

Biology
Section 1 — Questions

Duration — 2 hours 30 minutes

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.

X8077502

SECTION 1 — 25 marks

Attempt ALL questions

1. Which row in the table describes the effects on red blood cells if they were left in the liquids shown for 20 minutes?

	Liquid	
	Pure water	**10% salt solution**
A	swell and burst	plasmolyse
B	swell and burst	shrink
C	become turgid	plasmolyse
D	become turgid	shrink

2. Which of the following statements is true for a DNA molecule?

A It is double-stranded and found in the nucleus

B It is single-stranded and found in the nucleus

C It is double-stranded and codes for making sugars

D It is single-stranded and codes for making proteins

3. A molecule of DNA has 4450 bases of which 890 are cytosine.

The number of adenine bases in this DNA molecule is

A 890

B 1335

C 1780

D 2670.

4. Which of the following statements matches a type of protein to its function?

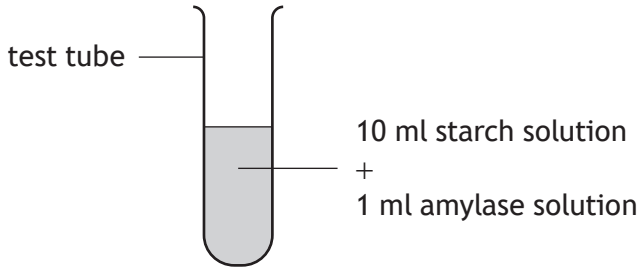
A Receptors target specific enzymes

B Enzymes carry chemical messages in the blood

C Antibodies destroy specific pathogens

D Hormones carry electrical impulses

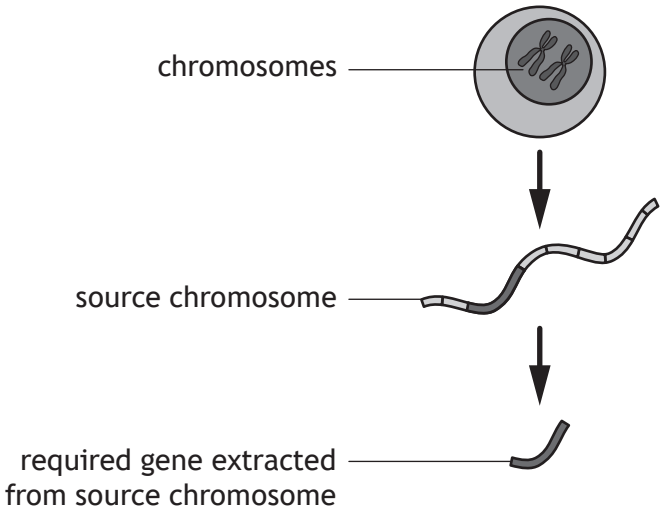
5. A student set up an experiment to investigate the breakdown of starch by the enzyme amylase.



Which row in the table describes the contents of a control tube for this experiment?

	Starch solution (ml)	Amylase solution (ml)	Water (ml)
A	0	10	1
B	10	0	1
C	1	10	0
D	10	0	0

6. The diagram shows part of the process of genetic engineering.



The extraction of the required gene from the source chromosome involves the use of

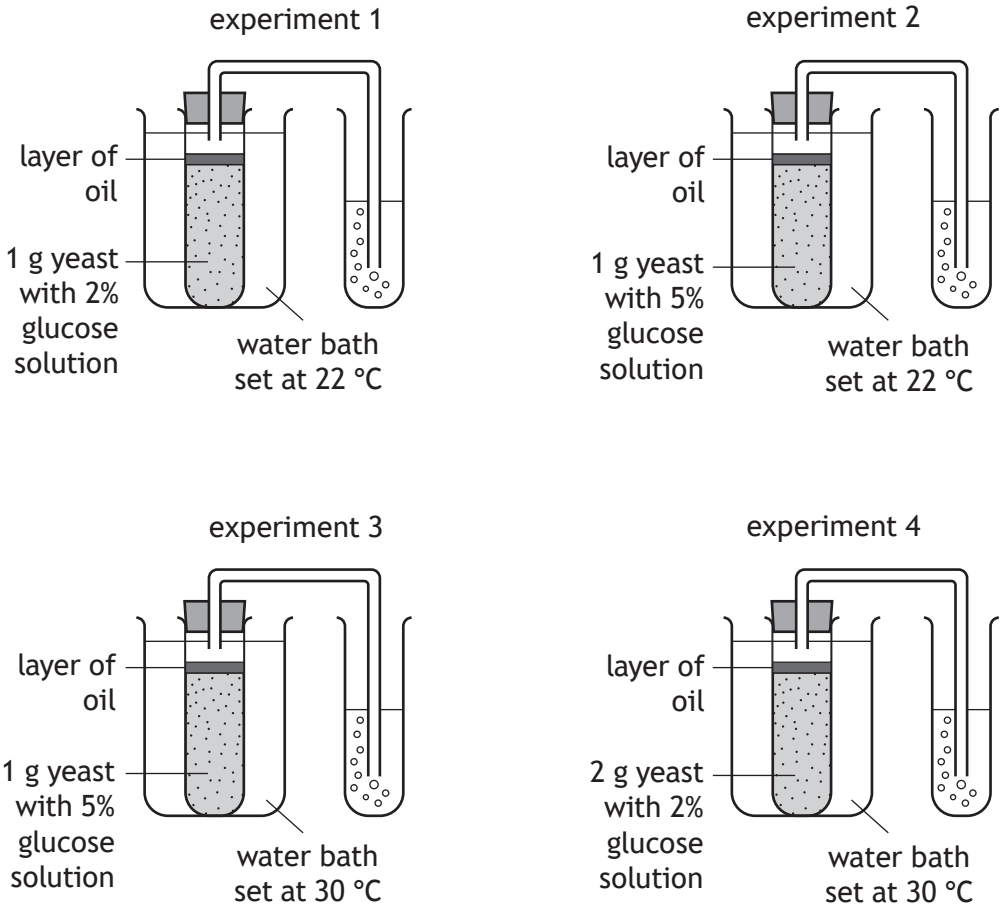
A bacteria

B hormones

C plasmids

D enzymes.

7. The diagrams show four experiments carried out as part of an investigation into the rate of respiration in yeast.



Which two experiments should be compared to show the effect of temperature on the rate of reaction?

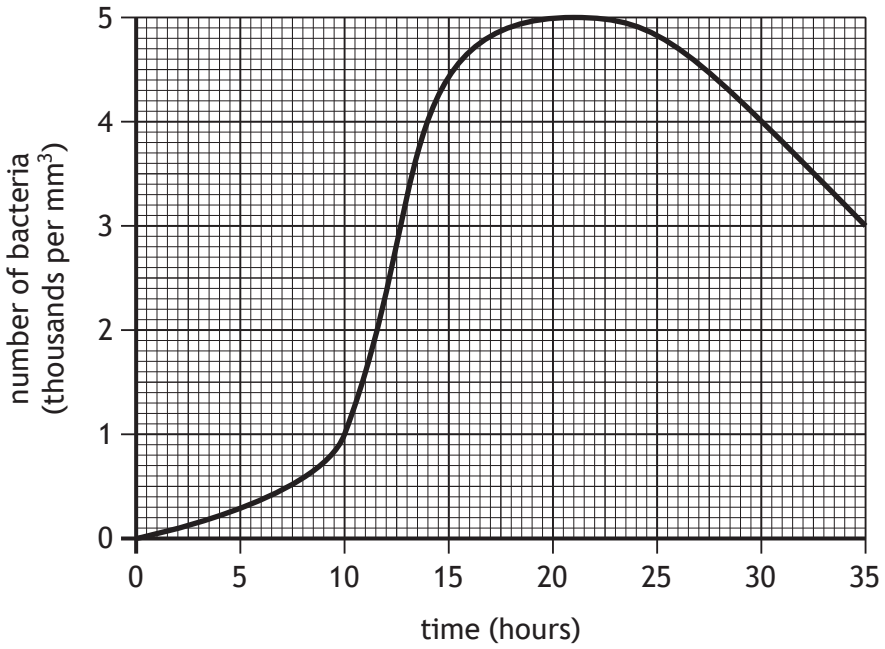
A 1 and 2

B 1 and 3

C 2 and 3

D 1 and 4

8. The graph shows the number of bacteria growing in a fermenter over 30 hours.



For how many hours was the number of bacteria 4000 per mm^3 or higher?

A 14

B 16

C 30

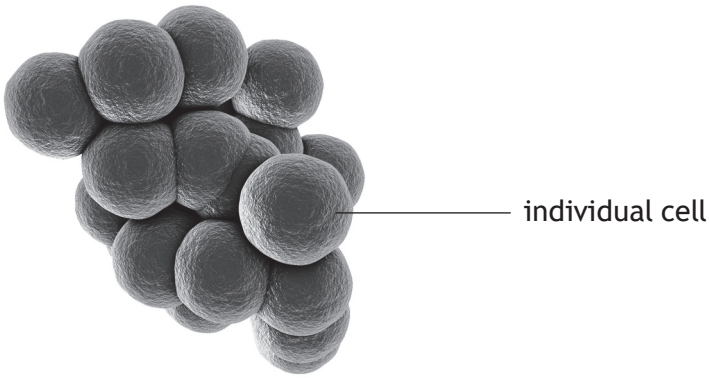
D 32

[Turn over

9. The following key can be used to identify bacteria.

1	Individual cells are spherical in shape	go to 2
	Individual cells are rod-shaped	go to 3
2	Cells are arranged in a single chain	*Streptococcus*
	Cells are not arranged in a single chain	go to 4
3	Cells are arranged in a single chain	*Streptobacillus*
	Cells are not arranged in a single chain	*Clostridium*
4	Cells are arranged in pairs	*Diplococcus*
	Cells are arranged in groups	*Staphylococcus*

Use the key to identify the bacteria shown.



A *Clostridium*

B *Staphylococcus*

C *Diplococcus*

D *Streptococcus*

10. A body cell of an organism containing 24 chromosomes is represented as (24).

Which column in the table represents the number of cells produced and the number of chromosomes in each cell after two cycles of cell division?

	A	B	C	D
Original body cell	(24)	(24)	(24)	(24)
After one cycle	(24)	(48)	(12) (12)	(24) (24)
After two cycles	(24)	(96)	(6) (6) (6) (6)	(24) (24) (24) (24)

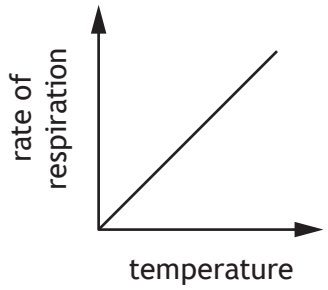
11. Which row in the table shows the effect a change in blood glucose levels has on glucagon production?

	Change in blood glucose level	Glucagon production
A	decreases	increases
B	increases	increases
C	increases	decreases
D	decreases	decreases

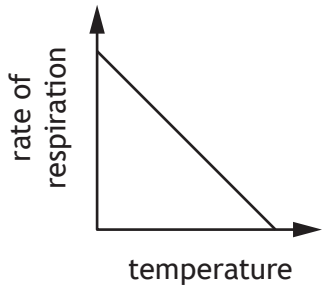
[Turn over

12. Which graph shows the effect of increasing temperature on the rate of respiration in germinating peas?

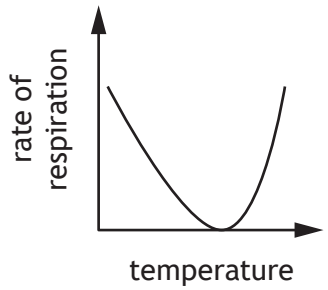
A



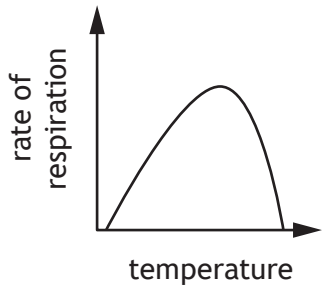
B



C



D



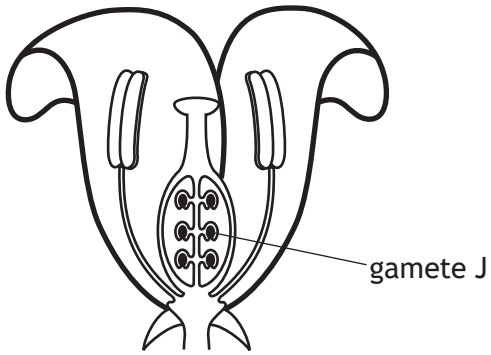
13. Which of the following is regulated by the medulla?

A Thinking
B Breathing
C Hearing
D Balancing

14. Which features are found in phloem tissue?

A Sieve plates and companion cells
B Hollow tubes and companion cells
C Sieve plates and lignin
D Hollow tubes and lignin

15. The diagram shows the main parts of a flower.



Which row in the table identifies gamete J and its site of production?

	Gamete J	**Site of production**
A	ovule	anther
B	pollen	anther
C	pollen	ovary
D	ovule	ovary

16. Maize plants can vary in height. They can produce either purple or yellow grains, and the grain shape can be either wrinkled or smooth.

Which row in the table identifies the type of variation shown by each of these characteristics?

	Height	**Grain colour**	**Grain shape**
A	continuous	continuous	discrete
B	discrete	continuous	continuous
C	continuous	discrete	discrete
D	discrete	discrete	continuous

[Turn over

17. Which of the following statements describes a feature of red blood cells?

A They are biconcave to absorb more oxygen

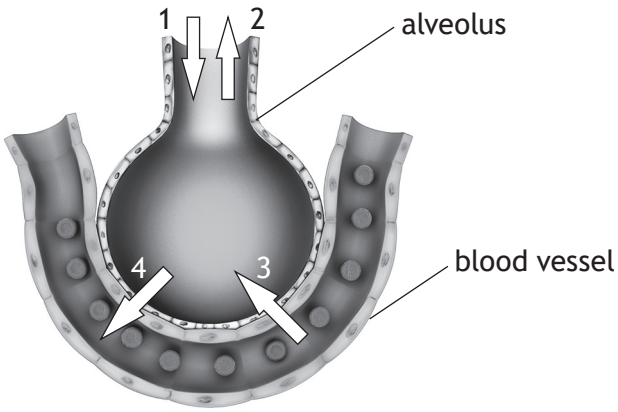
B They bind to oxygen to form haemoglobin

C They carry out phagocytosis

D They are part of the immune system

18. The diagram represents one alveolus in the lungs.

Which two arrows show the direction of flow of carbon dioxide produced by respiration?



A 1 and 4

B 1 and 3

C 2 and 3

D 2 and 4

19. The total variety of all living things on Earth is described as the

A biodiversity

B species

C community

D population.

20. In an investigation into density of planting, it was found that a lower mass of grain was harvested per plant when the density of wheat plants was at its highest.

This was due to

A less disease

B more nutrients available

C less space for weeds

D more competition for light and nutrients.

23. A marine food chain is shown.

The quantity of energy available to the killer whale is the energy that the seal used for

A swimming
B keeping warm
C growth
D catching cod.

24. Which row in the table identifies the effects of an algal bloom in a freshwater loch?

	Light levels	**Number of bacteria**	**Oxygen levels**	**Variety of other species**
A	increase	increase	increase	decrease
B	decrease	decrease	decrease	increase
C	increase	increase	decrease	decrease
D	decrease	increase	decrease	decrease

25. The following three processes occur during speciation.

1 Mutation
2 Natural selection
3 Isolation

The order in which they occur is

A 3, 2, 1
B 1, 2, 3
C 3, 1, 2
D 2, 3, 1.

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

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