National Qualifications 2016

X707/75/02

Biology
Section 1—Questions

MONDAY, 9 MAY

1:00 PM – 3:00 PM

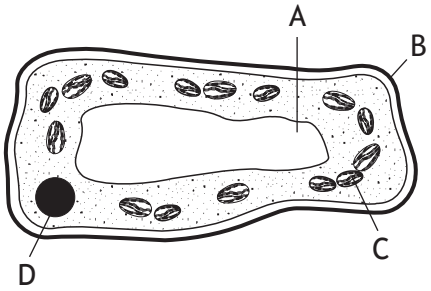
Instructions for the completion of Section 1 are given on *Page 02* of your question and answer booklet X707/75/01.

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.

SECTION 1

1. The diagram below shows parts of a plant cell.



Which part of this cell is composed of cellulose?

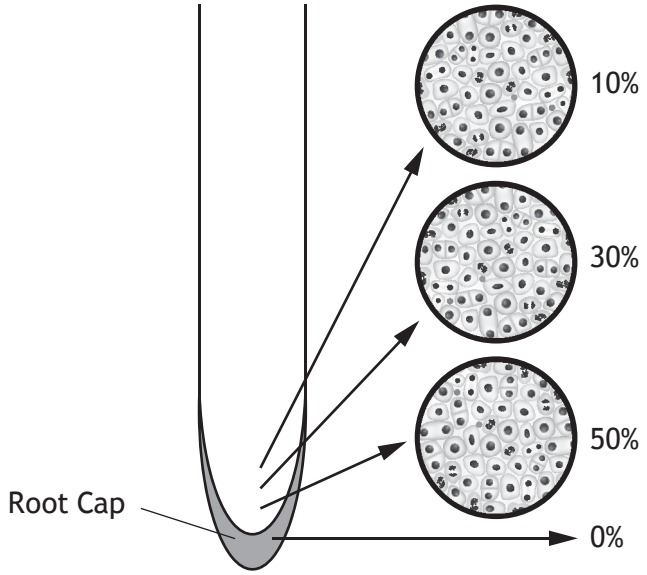
2. Four cylinders of potato tissue were weighed and each was placed into a salt solution of a different concentration.

The cylinders were reweighed after one hour and the results are shown below.

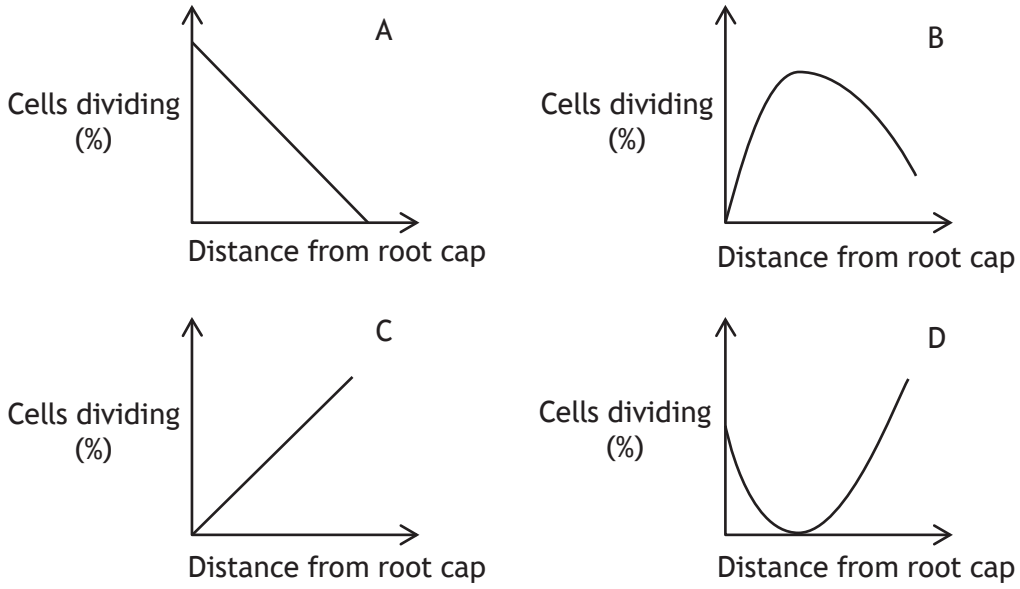
Salt Solution	I*nitial mass of potato cylinder* (g)	*Final mass of potato cylinder* (g)
A	10·0	7·0
B	10·0	9·4
C	10·0	11·2
D	10·0	12·6

In which salt solution would most potato cells be plasmolysed?

3. The diagram below shows the percentage of cells dividing in four areas of an onion root.



Which graph represents the number of cells dividing in this root?



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4. Which of the following shows the correct DNA base pairing?

A
A – C
C – G
G – C
T – A

B
A – T
C – G
G – T
T – A

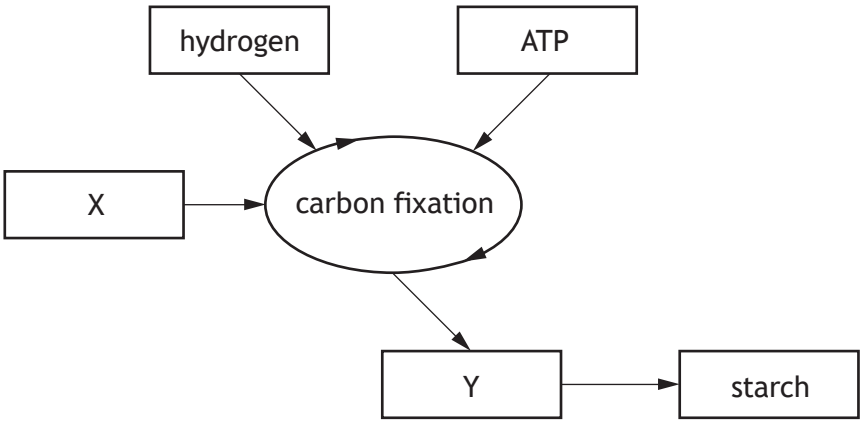
C
A – G
C – G
G – A
T – A

D
A – T
C – G
G – C
T – A

5. Hormones are composed of

A glycerol
B glucose
C protein
D starch.

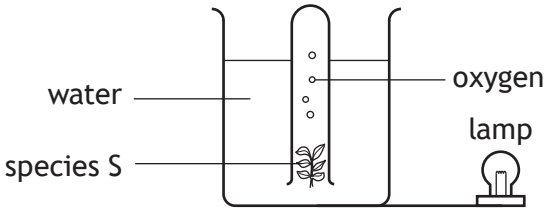
6. The diagram below shows the carbon fixation stage of photosynthesis.



Which row in the table below identifies X and Y?

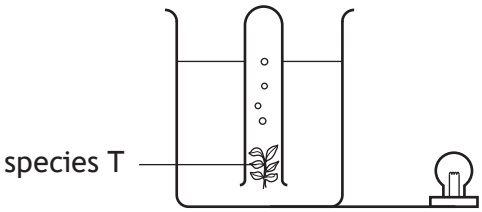
	X	*Y*
A	Sugar	Oxygen
B	Water	Carbon dioxide
C	Carbon dioxide	Sugar
D	Water	Oxygen

7. An investigation was carried out to compare the rate of oxygen gas production by two different species of water plant, S and T.

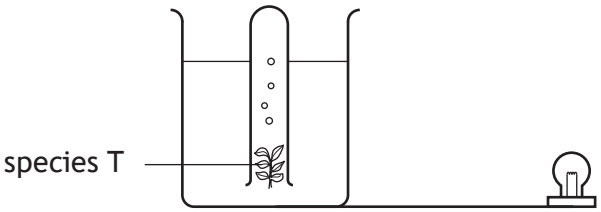


Which diagram below shows the set-up for species T, that would allow a valid comparison in the rate of oxygen production of the two species?

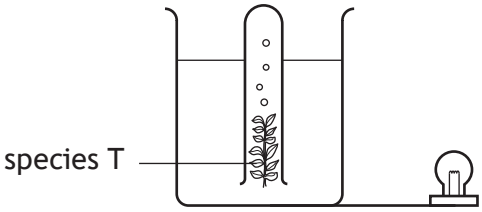
A



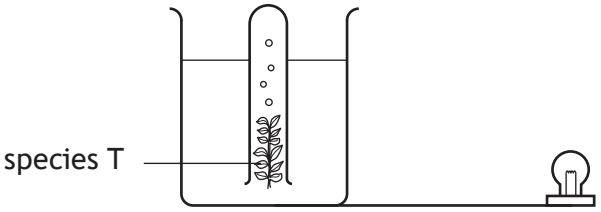
C



B



D



8. Each skin cell in a mouse has 40 chromosomes. How many chromosomes were present in each cell after dividing four times during cell culture?

A 10

B 20

C 40

D 160

[Turn over

9. Specialisation of cells in animals leads to the formation of

A tissues and organs

B meristems and organs

C stem cells and tissues

D stem cells and meristems.

10. The table below shows the blood glucose levels of two people after eating the same meal.

The normal range of blood glucose levels is 82–110 mg/dL.

Time after eating meal (min)	*Blood glucose levels* (mg/dL)	
	Person A	*Person B*
30	120	140
60	140	170
90	110	190
120	90	180
150	85	170
180	90	160

Using the information given, which of the following statements is correct?

A Person A always stayed within the normal range.

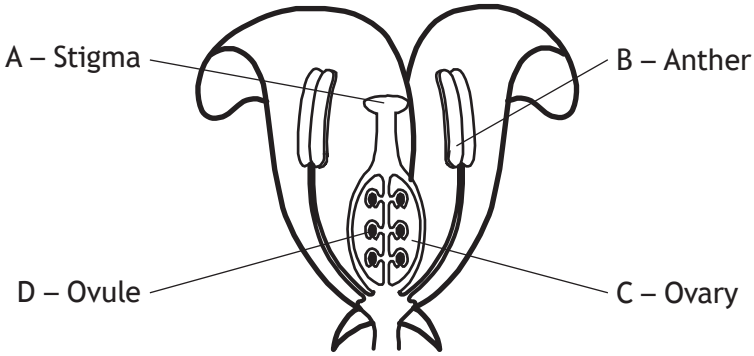
B Person B was outwith the normal range 180 minutes after eating.

C Person B had a level twice as high as that of person A 180 minutes after eating.

D Person A and person B both had their highest levels 90 minutes after eating.

11. The diagram below shows the structure of a flower.

Where are the male gametes produced?



12. Most features of an individual phenotype are

A controlled by a single gene and show continuous variation

B controlled by a single gene and show discrete variation

C polygenic and show continuous variation

D polygenic and show discrete variation.

13. The following diagram shows the inheritance of coat colour in guinea pigs.

P Phenotype Black guinea pig X White guinea pig

P Genotype: BB bb

F1 Genotype: Bb

F2 Genotypes: BB and Bb and bb

Which of the following generations contain heterozygous individuals?

A P and F1

B P and F2

C F1 and F2

D P, F1 and F2

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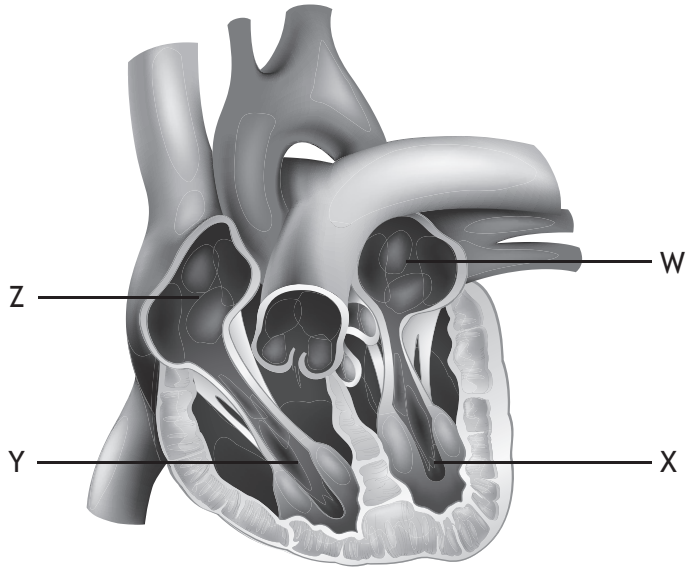
14. The diagram below shows the heart and associated blood vessels.



Which of the following statements is correct?

A W is the left atrium which receives blood from the body.
B X is the left ventricle which pumps blood to the body.
C Y is the right atrium which receives blood from the lungs.
D Z is the right ventricle which pumps blood to the lungs.

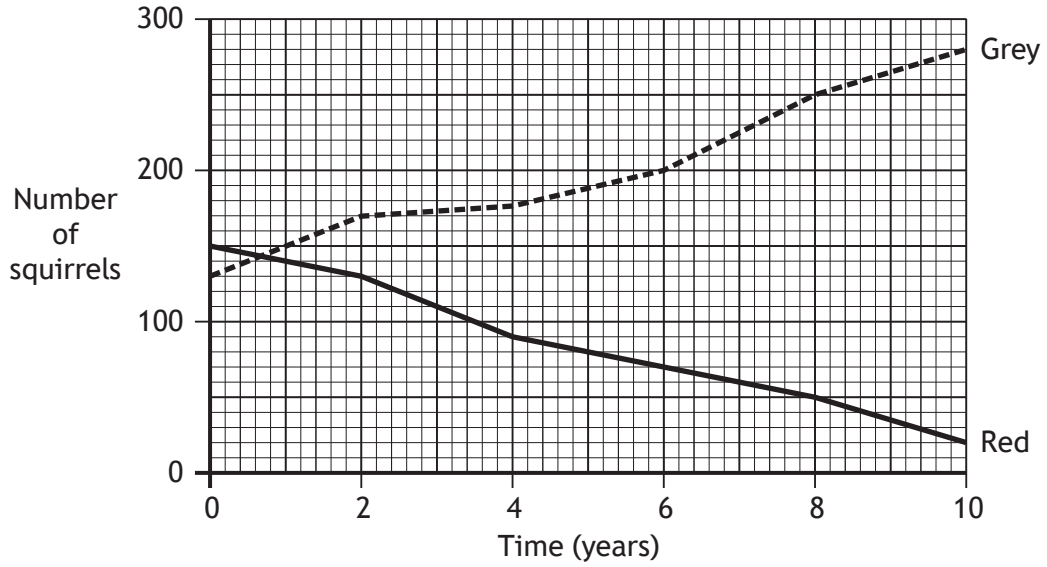
15. Which of the following statements best describes a niche?

A A living factor which affects biodiversity in an ecosystem.
B A region of our planet as distinguished by its climate, fauna and flora.
C All the organisms in an area and their habitat.
D The role that an organism plays within a community.

16. An ecosystem receives 6 000 000 units of energy from the sun.
Of this energy, 95% is **not** used in photosynthesis.
The amount of energy captured by the producers in this ecosystem is

A 30 000
B 300 000
C 570 000
D 5 700 000.

17. The graph below shows changes in the population of red and grey squirrels in an area of woodland over a 10 year period.



Which of the following conclusions can be drawn from the graph?

A The total number of squirrels decreased over 10 years.

B The population of red squirrels showed a greater change than the grey squirrels.

C The population of grey squirrels showed a greater change than the red squirrels.

D After 8 years there were 4 times as many grey squirrels as red squirrels.

18. Which of the following is a source of new alleles in a population?

A Mutation

B Isolation

C Natural selection

D Environmental conditions

19. Indicator species can provide information about

A numbers of organisms in a lake

B numbers of predators in a woodland

C levels of light in an ecosystem

D levels of pollution in a river.

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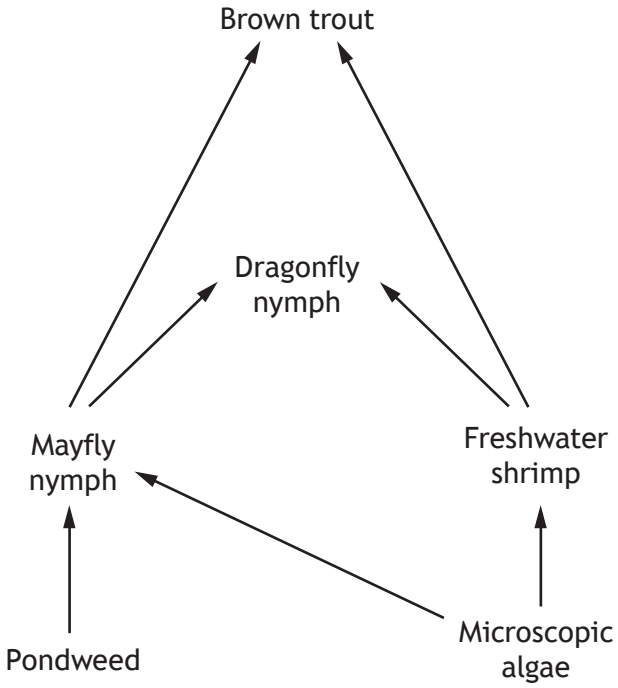
20. The diagram below represents a freshwater food web.



The number of freshwater shrimps was found to have decreased dramatically.

Predict the effect this will have on the numbers of dragonfly nymphs and microscopic algae.

A Both populations would decrease.

B Both populations would increase.

C Microscopic algae would decrease and dragonfly nymphs would increase.

D Microscopic algae would increase and dragonfly nymphs would decrease.

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

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