Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **May/June 2021**

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

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[Turn over

1 What is a characteristic of all living organisms?

A breathing

B circulation

C egestion

D sensitivity

2 What is the most accurate method of classifying animals?

A comparing bones

B comparing the morphology of organisms

C identifying similarities in anatomy

D identifying similarities in DNA base sequences

3 Scientists discover a new species of animal.

It has a segmented body with two pairs of legs on each segment.

To which group of animals does this new species belong?

A arachnids

B crustaceans

C insects

D myriapods

4 In which part of a cell does photosynthesis take place?

A vacuole

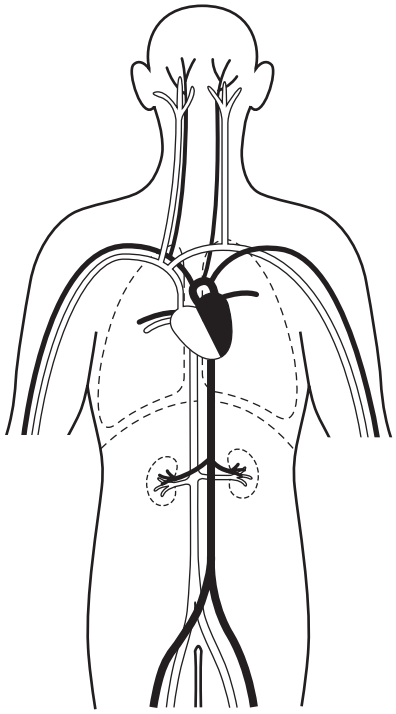
B nucleus

C chloroplast

D cytoplasm

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5 The diagram shows some of the blood vessels and other structures in the human body.



The blood vessels shown are all parts of the same

A cell.

B organ.

C organ system.

D tissue.

6 A photograph shows a plant cell nucleus measuring 2 mm across.

If the magnification of the cell is ×500, what is the actual size of the nucleus?

A 0.00002 mm **B** 0.004 mm **C** 0.04 mm **D** 250 mm

7 By which process do oxygen and carbon dioxide move between cells and capillaries?

A breathing

B diffusion

C excretion

D respiration

8 Which process is involved in the uptake of glucose by the epithelial cells of kidney tubules?

A active transport

B osmosis

C translocation

D transpiration

9 Which element is found in proteins but **not** carbohydrates?

A carbon

B hydrogen

C nitrogen

D oxygen

10 A DNA sample was tested to identify its bases.

35% of the bases in the DNA were G.

Which row shows the percentages of the other bases?

	percentage of bases		
	A	C	T
A	15	15	35
B	15	35	15
C	35	15	35
D	35	35	15

11 Starch is digested by amylase in the mouth, but it is not digested in the stomach.

What is the reason for this?

A All starch digestion is completed in the mouth.

B The pH in the stomach is not suitable for the amylase to work.

C The starch does not stay in the stomach long enough to be digested.

D The temperature in the stomach is not suitable for the amylase to work.

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12 Which type of molecule are enzymes made of?

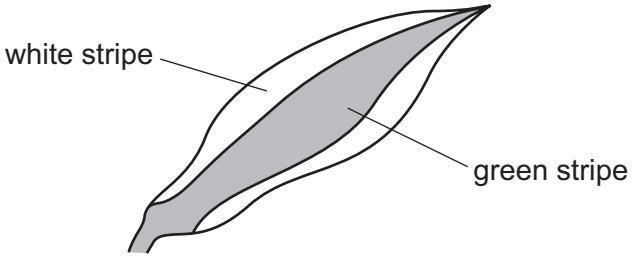
A carbohydrate

B fat

C protein

D vitamin

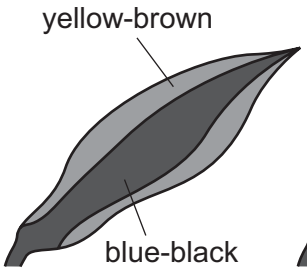
13 A plant with striped leaves was kept in bright light for six hours.



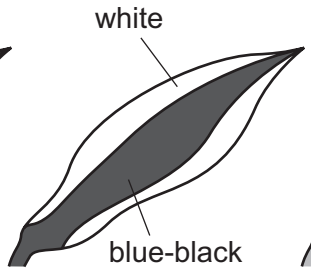
A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?

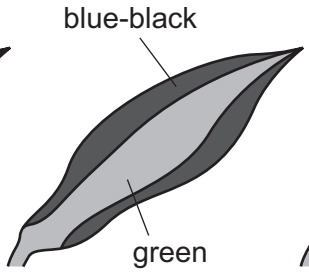
A



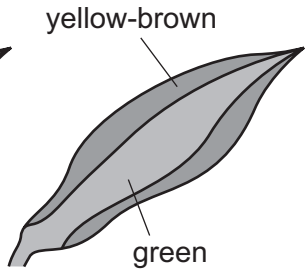
B



C

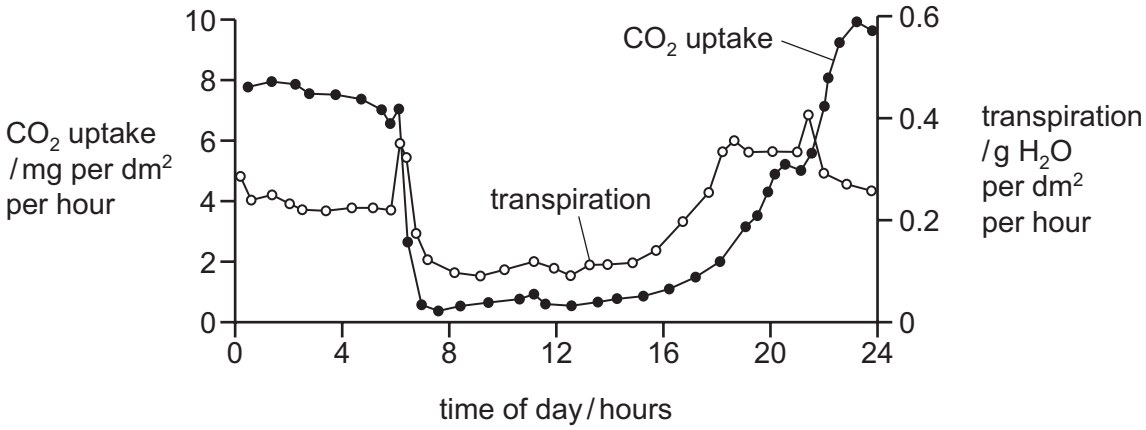


D



14 The graph shows daily carbon dioxide uptake and transpiration by the plant *Agave americana*.

The plant is adapted to live in very dry conditions.



What can be concluded from this graph?

A More stomata are closed during dark periods.

B More stomata are closed during light periods.

C There is no carbon dioxide uptake during dark periods.

D There is no water uptake during light periods.

15 Statements 1 to 4 describe stages in the development of cholera.

1 Chloride ions are secreted into the gut.

2 Osmosis causes water to move into the gut.

3 The infected person becomes dehydrated.

4 Toxins are produced by the pathogenic bacteria.

What is the correct sequence of the four stages?

A $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

B $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

C $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

D $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

16 What is the cause of the **start** of dental decay?

A Acid dissolves dentine.

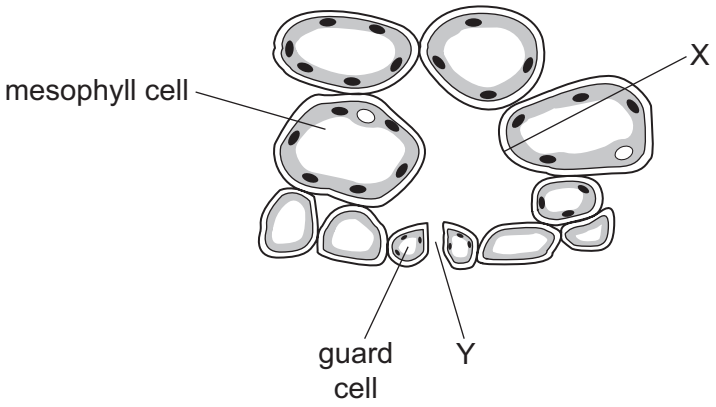
B Acid dissolves enamel.

C Sugars dissolve dentine.

D Sugars dissolve enamel.

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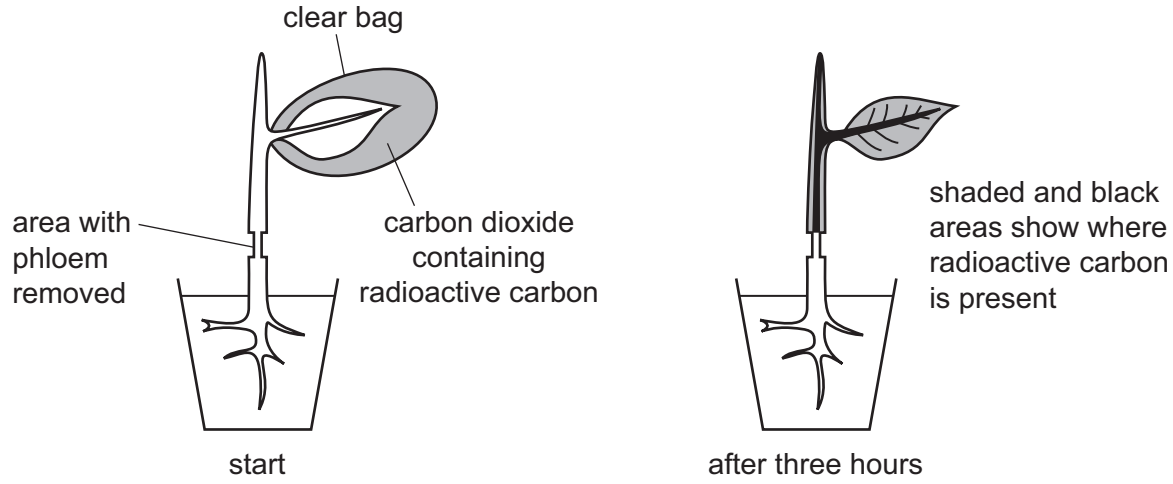
17 The diagram shows one of the stomata of a leaf, and some of the cells that are near it.



During transpiration, what describes the movement of water at X and at Y?

	movement of water at X	movement of water at Y
A	evaporation	diffusion
B	evaporation	osmosis
C	osmosis	diffusion
D	osmosis	osmosis

18 A ring of phloem tissue was removed from the stem of a plant, as shown in the first diagram. Carbon dioxide containing radioactive carbon was supplied to the leaf of the plant. The second diagram shows where radioactive carbon was present after three hours.



Which statements does the experiment support?

1 Translocation of sugar only occurs in one direction.

2 Translocation occurs in the phloem.

3 Translocation requires energy.

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

19 Through which blood vessels does blood flow into the heart?

1 pulmonary artery

2 pulmonary vein

3 vena cava

4 aorta

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

20 What is an angioplasty?

A a recording of the heart's electrical activity to check for abnormalities

B an operation to insert a new vessel that diverts blood around a narrowed section

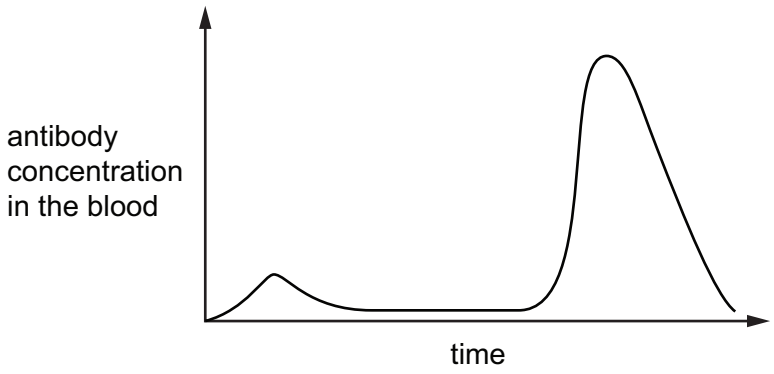
C the insertion of a tube into a blood vessel to allow blood to flow more freely

D the widening of a blood vessel by means of a balloon-like device

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21 A child is vaccinated against measles. After a period of time the child is infected with the measles virus.

The graph shows the concentration of measles antibodies in the child's bloodstream during this time.



Which statement is consistent with the information in the graph?

A After the vaccination, the child produced memory cells.

B The child had passive immunity against measles.

C The measles virus contains antibodies.

D The vaccination failed to protect the child against measles.

22 Which sequence of changes takes place when we breathe in?

A diaphragm contracts → volume of thorax increases → pressure in lungs decreases

B diaphragm contracts → volume of thorax increases → pressure in lungs increases

C diaphragm relaxes → volume of thorax increases → pressure in lungs decreases

D diaphragm relaxes → volume of thorax increases → pressure in lungs increases

23 Which statement applies to respiration?

A It involves enzymes.

B Energy is absorbed.

C It only takes place in animal cells.

D Oxygen is released.

24 Which statement about respiration is correct?

A Deep breathing after exercise reduces an oxygen debt.

B Lactic acid produced by aerobic respiration causes an oxygen debt.

C The energy in ethanol molecules is released by muscle cells.

D The energy in lactic acid is released by anaerobic respiration.

25 A student carried out an experiment to investigate the effect of temperature on the volume of urine produced.

Which row shows the experiment where the environmental temperature was increased from 20 °C to 40 °C but no other changes were made?

	urine produced / cm^3 per hour	
	before	after
A	60	60
B	80	40
C	120	145
D	100	130

26 Which row shows the levels of organisation for structures associated with the eye?

	cell	tissue	organ	organ system
A	cone	fovea	endocrine	eye
B	rod	retina	eye	nervous
C	antibody	muscle	artery	circulatory
D	lymphocyte	capillary	vein	sensory

27 Which row correctly compares hormonal control with nervous control?

	speed of action of hormonal control	how long the effects of the hormone lasts
A	rapid	short
B	slow	long
C	rapid	long
D	slow	short

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28 Which statement about the regulation of human body temperature is correct?

A Vasoconstriction of skin arterioles occurs when the body temperature is too low.

B Vasodilation of skin arterioles occurs when the body temperature is too low.

C Vasoconstriction of skin capillaries occurs when the body temperature is too high.

D Vasodilation of skin capillaries occurs when the body temperature is too low.

29 Why are people advised **not** to drive a car after drinking an excessive quantity of alcohol?

A Alcohol is a depressant.

B Alcohol is a stimulant.

C Alcohol decreases reaction time.

D Alcohol is addictive.

30 What is a disadvantage of asexual reproduction when a new crop disease appears on a farm?

A Asexual reproduction only requires one parent plant.

B Asexual reproduction does **not** require a pollinator.

C Asexual reproduction does **not** lead to genetic variation in offspring.

D Asexual reproduction does **not** disperse offspring over a wide area.

31 Where is progesterone produced in the late stages of pregnancy?

A ovaries

B pancreas

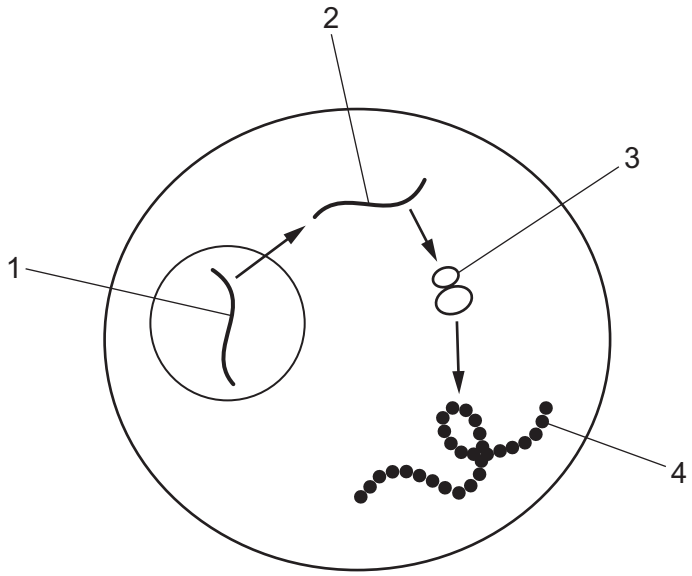
C placenta

D uterus

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[Turn over

32 The diagram shows structures involved in the synthesis of an enzyme in a cell.



What is structure 2?

A amino acids

B DNA

C mRNA

D protein

33 Which definition of mitosis is correct?

A nuclear division giving rise to genetically different cells

B nuclear division giving rise to genetically identical cells

C fusion of nuclei giving rise to a genetically different cell

D fusion of nuclei giving rise to a genetically identical cell

34 What happens during meiosis?

A A haploid cell produces haploid cells that are genetically identical.

B A haploid cell produces haploid cells that are genetically different.

C A diploid cell produces haploid cells that are genetically identical.

D A diploid cell produces haploid cells that are genetically different.

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35 What is a correct description of a gene mutation?

A a duplicate copy of DNA

B a change in the base sequence of DNA

C an increase in the number of chromosomes

D a phenotypic variation

36 Adaptive features are inherited features that increase fitness.

What is the definition of fitness?

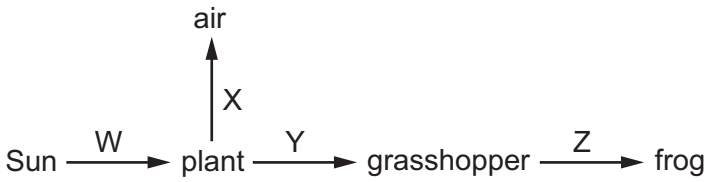
A artificial selection to improve organisms

B the change in adaptive features of a population over time

C the probability of an organism surviving and reproducing in the environment in which it is found

D the probability of variation in a population

37 The diagram shows energy transfer through a food chain. The labelled arrows represent the energy transfers.



Which energy transfers are shown by the labelled arrows?

A X is heat energy transfer and Z is chemical energy transfer.

B Y is chemical energy transfer and X is light energy transfer.

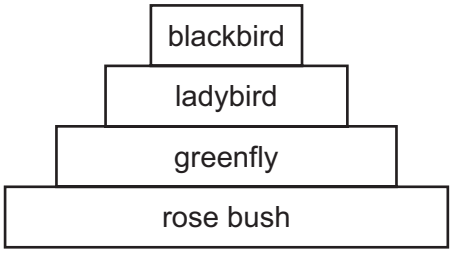
C X is chemical energy transfer and Y is heat energy transfer.

D Z is heat energy transfer and W is light energy transfer.

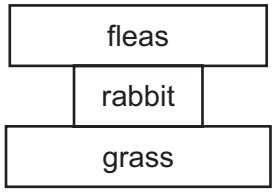
38 The organisms in a food chain can be represented by pyramids of numbers or pyramids of biomass.

Which diagram represents a pyramid of numbers?

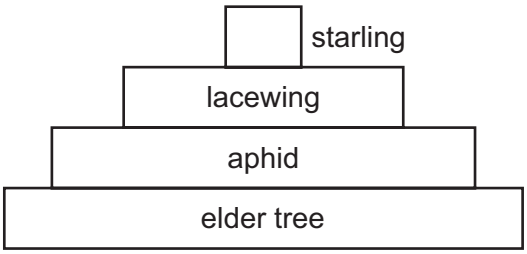
A



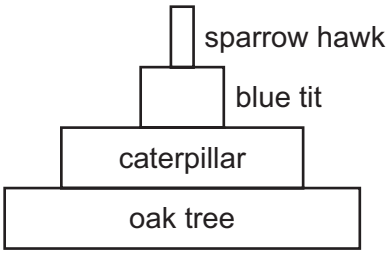
B



C



D



39 Scientists wanted to know which one of four different varieties of bacteria, **A**, **B**, **C** or **D**, would be the best to use to make a protein.

They grew the bacteria for five days using the same starting mass of each bacterium. They then measured the mass of bacteria and the mass of protein produced per gram of bacteria.

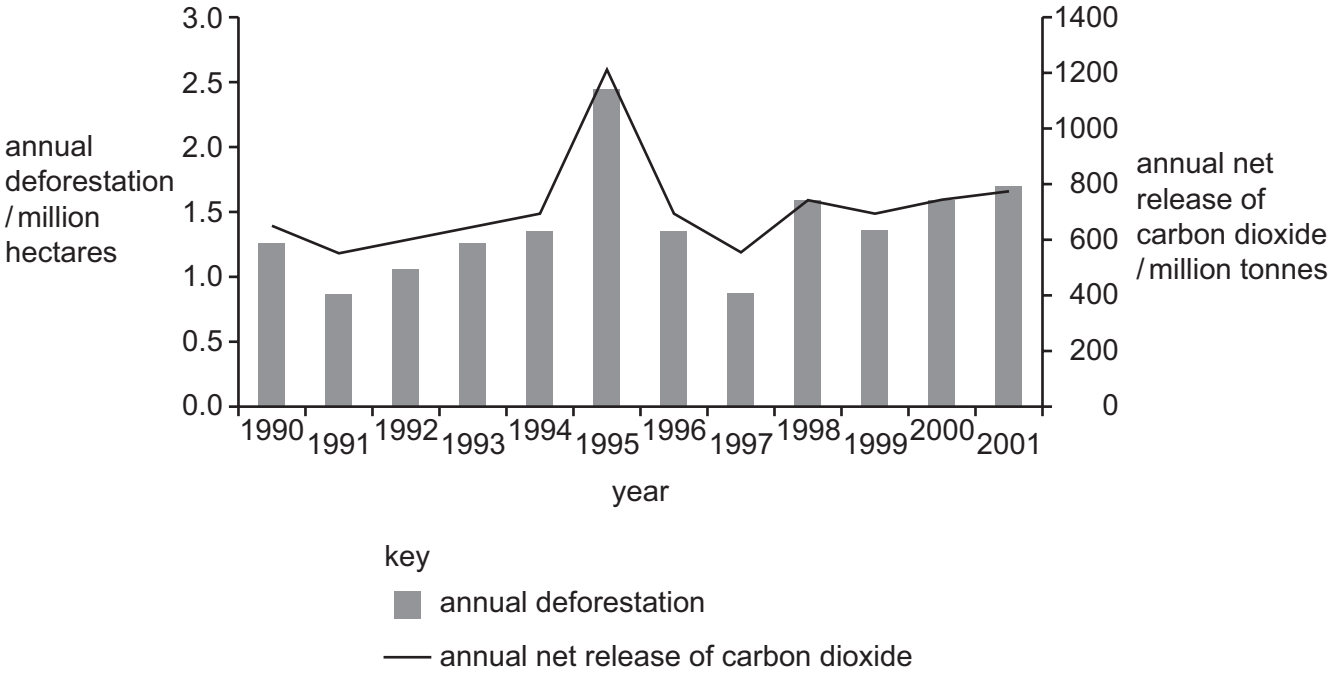
The results are shown in the table.

Which variety of bacteria should the scientists choose?

	mass of bacteria at the start / g	mass of bacteria after five days / g	mass of protein / mg protein per g of bacteria
A	2	200	10
B	2	800	1
C	2	100	12
D	2	100	6

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40 The graph shows the annual deforestation and annual net release of carbon dioxide from an area of tropical forest between 1990 and 2001.



Which statements are correct?

1 The highest rate of deforestation occurred in 1995.

2 There is a close relationship between annual deforestation and carbon dioxide release.

3 The annual net release of carbon dioxide increases every year.

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

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