Cambridge Assessment International Education

Cambridge IGCSE™

BIOLOGY **0610/23**

Paper 2 Multiple Choice (Extended) **May/June 2023**

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.

IB23 06_0610_23/4RP
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1 What are two characteristics of all living organisms?

A breathing and reproduction

B photosynthesis and excretion

C reproduction and respiration

D respiration and photosynthesis

2 The photograph shows an organism.



Which visible feature can be used to classify this organism as a bird?

A feathers

B lays eggs

C two legs

D wings

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3 Which statement about cell structure is correct?

A An animal cell has a cell wall.

B A bacterium has a cell wall.

C An animal cell has chloroplasts.

D A bacterium has chloroplasts.

4 The diameter of an egg cell from a frog is 2.5 mm.

The diameter of an egg cell from a human is 120 μm.

Which value shows approximately how many times larger an egg cell from a frog is than an egg cell from a human?

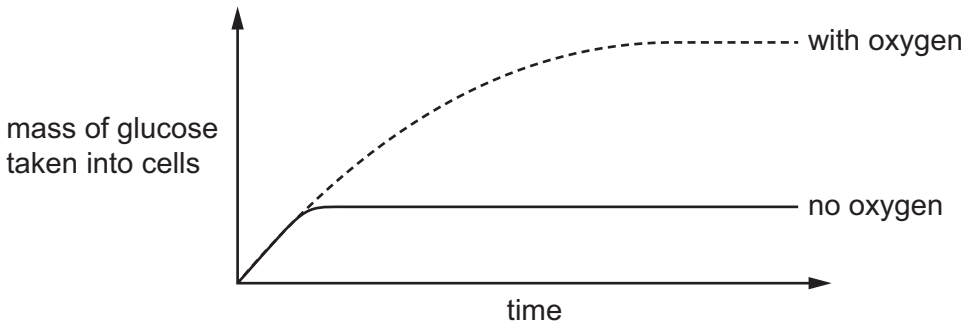
A ×2 **B** ×21 **C** ×48 **D** ×300

5 When a plant cell is put into pure water it .....1..... water by osmosis and becomes .....2..... .

Which words should be used to fill gaps 1 and 2 to complete the sentence?

	1	2
A	gains	plasmolysed
B	gains	turgid
C	loses	plasmolysed
D	loses	turgid

6 The graph shows the results of an investigation into the effect of oxygen on the uptake of glucose by cells.



Which conclusion can be made about these data?

A Glucose only enters the cells by active transport.

B Glucose only enters the cells by diffusion.

C Glucose enters the cells by both active transport and diffusion.

D Glucose enters the cells by osmosis.

7 The table shows the results of food tests carried out on a fruit.

test	Benedict's solution	biuret	ethanol emulsion	iodine solution
result	positive	positive	negative	negative

What did the fruit contain?

A fat and reducing sugar

B fat and starch

C protein and reducing sugar

D protein and starch

8 What describes the structure of DNA?

A Each strand contains chemicals called fatty acids.

B Each strand contains a sequence of amino acids.

C Each strand contains mRNA.

D Two strands coil to form a double helix.

9 The statements are about enzymes.

1 Enzymes are catalysts.

2 Enzymes are proteins.

3 Enzymes are used up during chemical reactions.

Which statements are correct?

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

10 When the temperature increases, the rate of an enzyme-catalysed reaction increases until the optimum temperature is reached.

Which statement explains why the rate increases?

A The enzyme and substrate have more kinetic energy and collide less frequently.

B The enzyme and substrate have less kinetic energy and collide more frequently.

C The enzyme and substrate have more kinetic energy and collide more frequently.

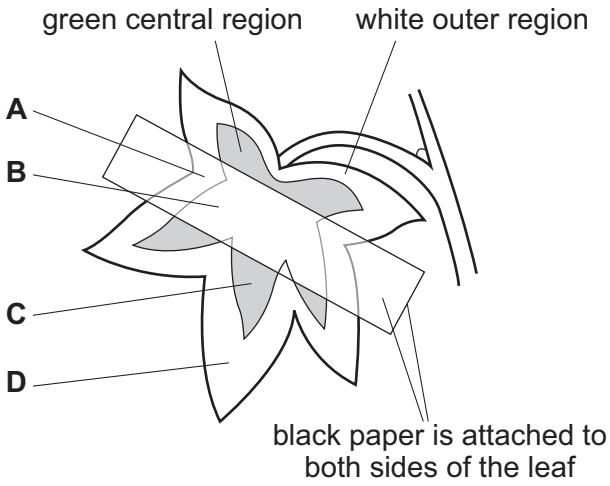
D The enzyme and substrate have less kinetic energy and collide less frequently.

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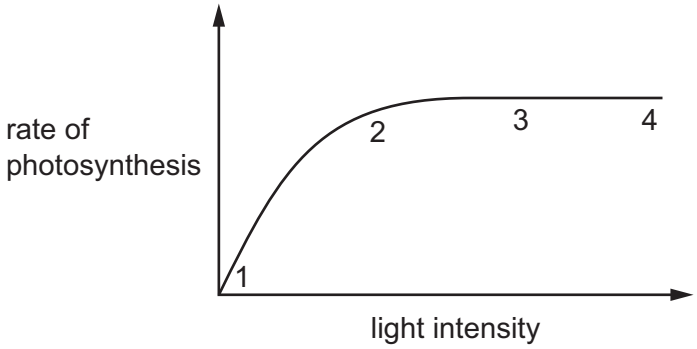
11 A plant with variegated leaves was placed in a dark cupboard for 48 hours so that all the starch was removed from the leaves. The variegated leaves have green parts and white parts.

Black paper was then fixed on one leaf and the plant was exposed to the light.

After 24 hours, which region of the leaf contained starch?



12 The graph shows the rate of photosynthesis with increasing light intensity.



Where is light intensity a limiting factor for photosynthesis?

A between 1 and 2

B between 1 and 3

C between 2 and 4

D between 3 and 4

13 In humans, which two components of the diet can be broken down to release energy?

A carbohydrate and fat

B carbohydrate and mineral ions

C protein and water

D vitamins and protein

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14 Which is a part of the small intestine?

A colon

B ileum

C oesophagus

D rectum

15 Which combination of environmental factors will cause the largest increase in the transpiration rate in a plant?

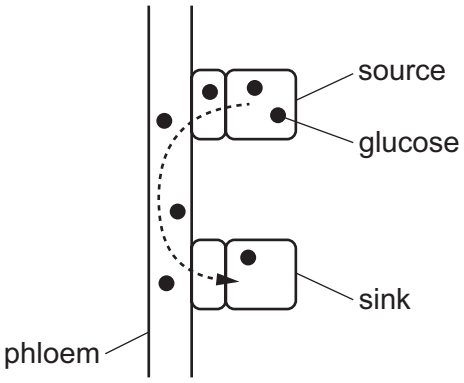
	wind speed	humidity	temperature	light intensity
A	high	high	low	low
B	high	low	high	high
C	low	high	low	high
D	low	low	high	low

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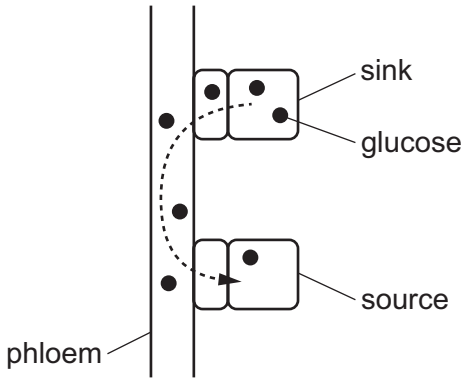
16 The diagrams represent the movement of substances between plant cells. The arrows indicate the direction the substance is moving in.

Which diagram of translocation is correctly labelled?

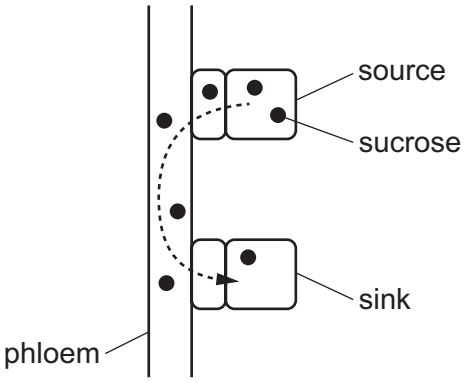
A



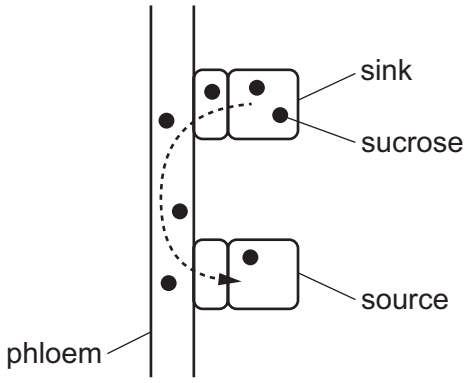
B



C

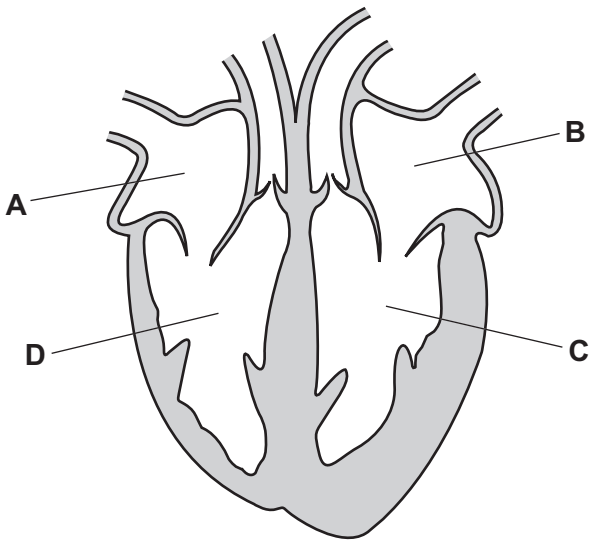


D

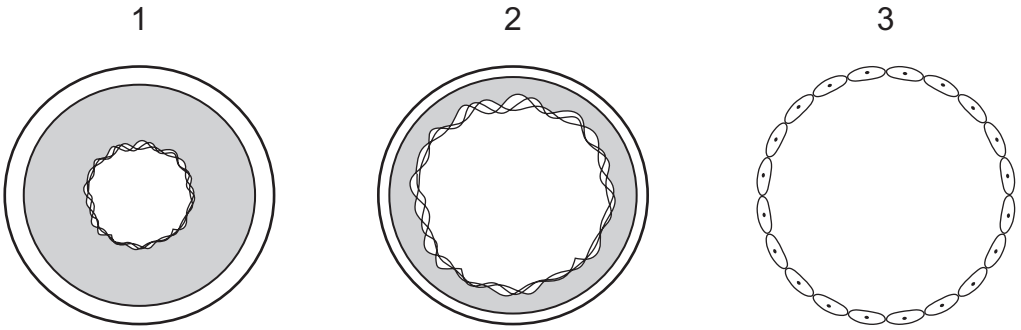


17 The diagram shows a section of the human heart.

Which label identifies the right ventricle?



18 The diagrams show sections through three types of blood vessel. They are **not** drawn to the same scale.



In which order will red blood cells flow through these vessels in the human body when travelling from the aorta to the right atrium of the heart?

A $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 3 \rightarrow 1$ **D** $3 \rightarrow 1 \rightarrow 2$

19 When a person is given a vaccine, a harmless pathogen is injected. The pathogen has .....1..... which cause lymphocytes to produce .....2..... . This is an example of .....3..... immunity.

Which words should be used to fill gaps 1, 2 and 3 to complete the sentences?

	1	2	3
A	antigens	antibodies	active
B	antigens	antibodies	passive
C	antibodies	antigens	active
D	antibodies	antigens	passive

20 What happens when a person breathes in?

A The external intercostal muscles and the internal intercostal muscles contract.

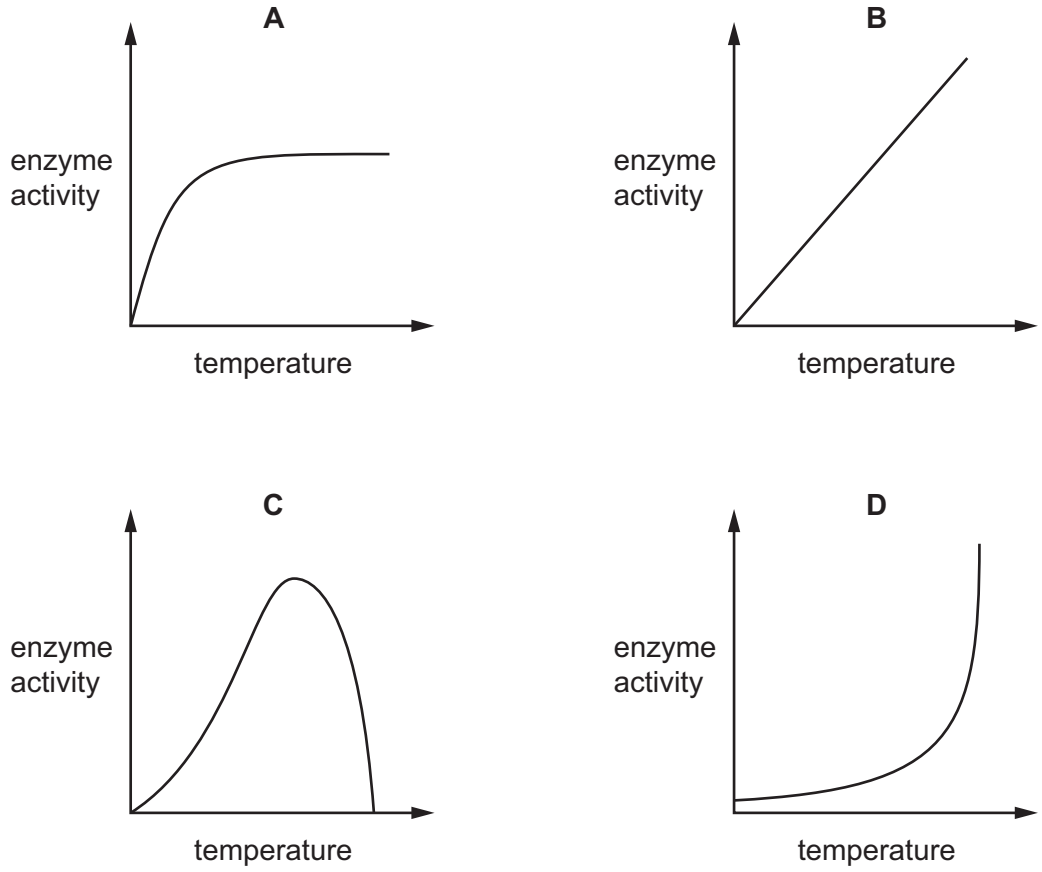
B The external intercostal muscles and the internal intercostal muscles relax.

C The external intercostal muscles relax and the internal intercostal muscles contract.

D The external intercostal muscles contract and the internal intercostal muscles relax.

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21 Which graph shows the effect of temperature on enzyme activity?



22 After running a fast race, some students have pains in their leg muscles due to a build up of lactic acid. A student wrote this explanation.

1 During the race, the cells did **not** have enough oxygen for aerobic respiration.

2 Anaerobic respiration occurs so some energy is released from glucose.

3 The lactic acid is produced by aerobic respiration.

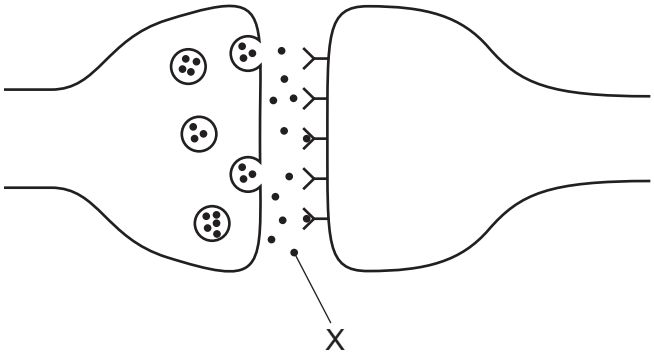
Which statements explain why the lactic acid built up in the muscles?

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

23 What is the name of the process that produces urea and the organ where urea is formed?

	process producing urea	organ where urea is formed
A	deamination	kidney
B	denitrification	kidney
C	deamination	liver
D	denitrification	liver

24 The diagram shows the gap between two neurones.



What is the name of X?

A neurotransmitter

B receptor

C synapse

D vesicle

25 Which statements are correct for cone cells in the eye?

1 Cone cells are located in the fovea of the retina.

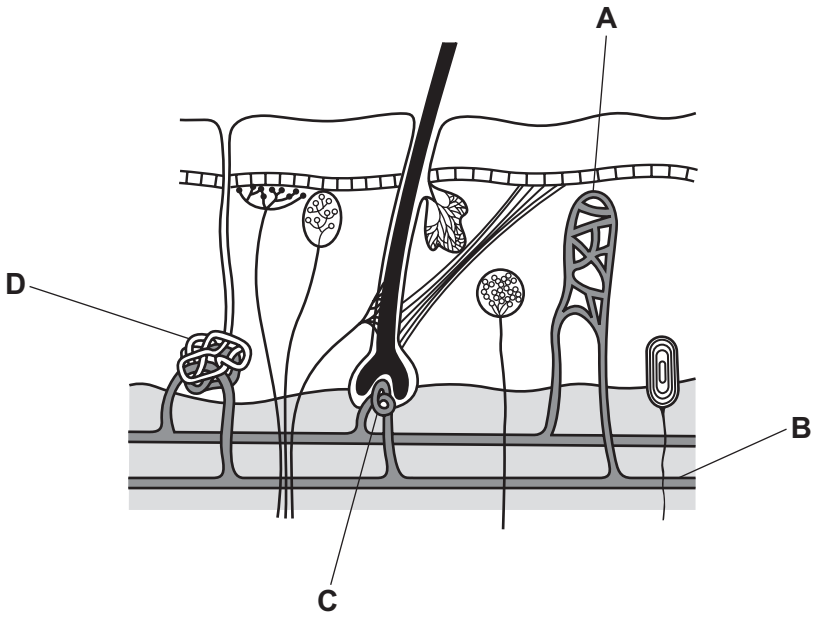
2 Cone cells detect colour.

3 Cone cells are more sensitive to light than rod cells.

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

26 The diagram shows the structure of the human skin.

Which structure constricts to reduce heat loss?



27 Where are the hormones oestrogen and progesterone produced during pregnancy?

A amniotic sac

B oviducts

C placenta

D umbilical cord

28 The umbilical artery takes blood from the fetus to the placenta.

The umbilical vein carries blood from the placenta to the fetus.

How do the contents of the umbilical artery differ from those of the umbilical vein?

	carbon dioxide	oxygen	urea
A	less	more	less
B	less	less	more
C	more	more	less
D	more	less	more

29 Which row shows some of the features involved in natural selection?

	many offspring are produced	humans choose desirable features	alleles are passed onto offspring
A	✓	✗	✗
B	✗	✓	✗
C	✗	✓	✓
D	✓	✗	✓

key

✓ = yes

✗ = no

30 Which substance is coded for by a length of DNA?

A base

B glucose

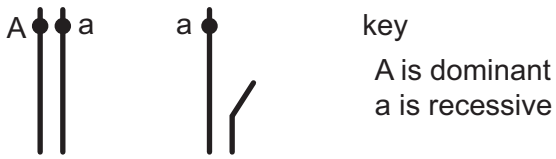
C glycerol

D lipase

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[Turn over

31 The diagram shows the sex chromosomes of a woman and of a man. Their genotypes for a recessive sex-linked condition are also shown.



What are the chances that their daughter will show the sex-linked condition?

A 0% **B** 25% **C** 50% **D** 75%

32 Which Punnett square shows a test cross that identifies a heterozygous parent?

A

	T	t
T	TT	Tt
t	Tt	tt

B

	T	T
T	TT	TT
t	Tt	Tt

C

	T	t
t	Tt	tt
t	Tt	tt

D

	T	T
t	Tt	Tt
t	Tt	Tt

33 What is a definition of variation?

A having two identical alleles of a particular gene

B individuals of the same species in one area

C differences between individuals of the same species

D the way in which new alleles are formed

34 What is a feature of some xerophytes?

A large air spaces in the tissues

B leaves rolled up and covered with hairs

C leaves with stomata on the upper surface

D thin cuticle

35 Where does the energy being transferred along a food chain originally come from?

A producer

B photosynthesis

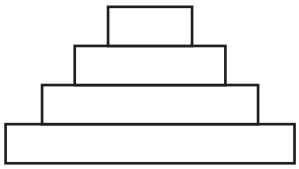
C carbon dioxide

D the Sun

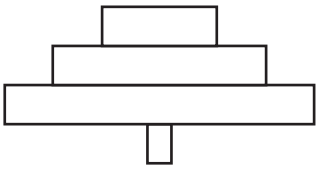
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36 Which diagram shows a pyramid of biomass for a forest?

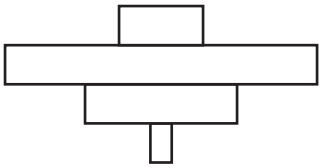
A



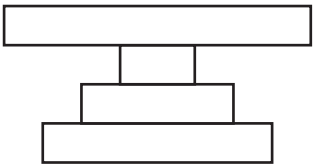
B



C



D



37 Which substance is an enzyme used in fruit juice production?

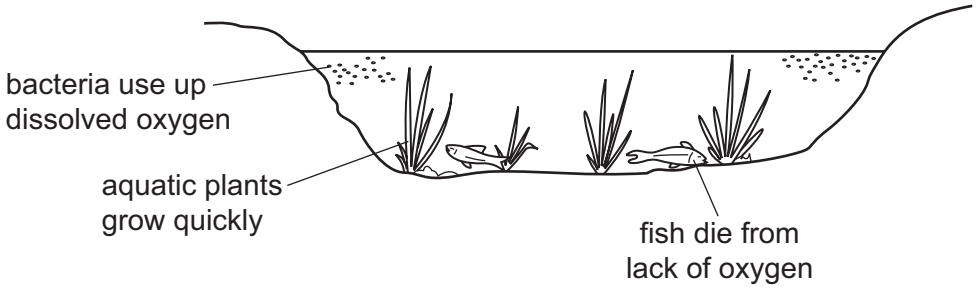
A lactase

B maltose

C pectinase

D pepsin

38 The diagram shows some of the effects of human activity on a river.



What could have caused these effects?

A air pollution

B deforestation

C over-use of fertilisers

D presence of herbicides

39 Genetic modification has been used to produce human insulin in bacterial cells.

What is inserted into the bacterial cells to produce human insulin?

A a human nucleus

B human plasmids

C recombinant insulin

D recombinant plasmids

40 Penicillin is made in a fermenter by growing organisms.

Which type of organism is used in the production of penicillin?

A bacterium

B fungus

C protoctist

D virus

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