UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2164550385

BIOLOGY **5090/02**

Paper 2 Theory **October/November 2008**

1 hour 45 minutes

Candidates answer Section A on the Question Paper.
Additional Materials: Answer Booklet/Paper

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Section A
Answer **all** questions.
Write your answers in the spaces provided on the Question Paper.
Section B
Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.
Write your answers on the separate Answer Paper provided.
Write an **E** (for Either) or an **O** (for Or) next to the number 8 in the Examiner's grid below to indicate which question you have answered.

You are advised to spend no longer than one hour on Section A and no longer than 45 minutes on Section B.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
Section A	
Section B	
6	
7	
8	
Total	

This document consists of **12** printed pages.

Section A

Answer **all** the questions in this section.

Write your answers in the spaces provided.

1 Fig. 1.1 shows a seed before germination and Fig. 1.2 shows the same seed after it has become a seedling.

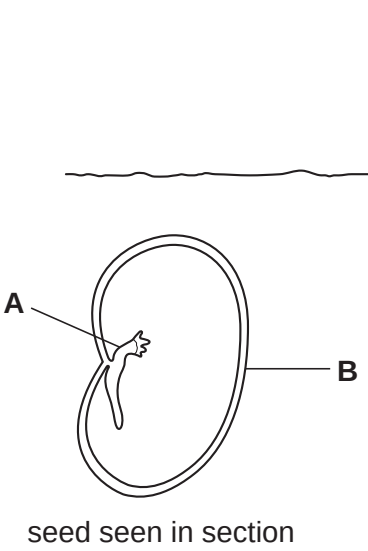

Fig. 1.1

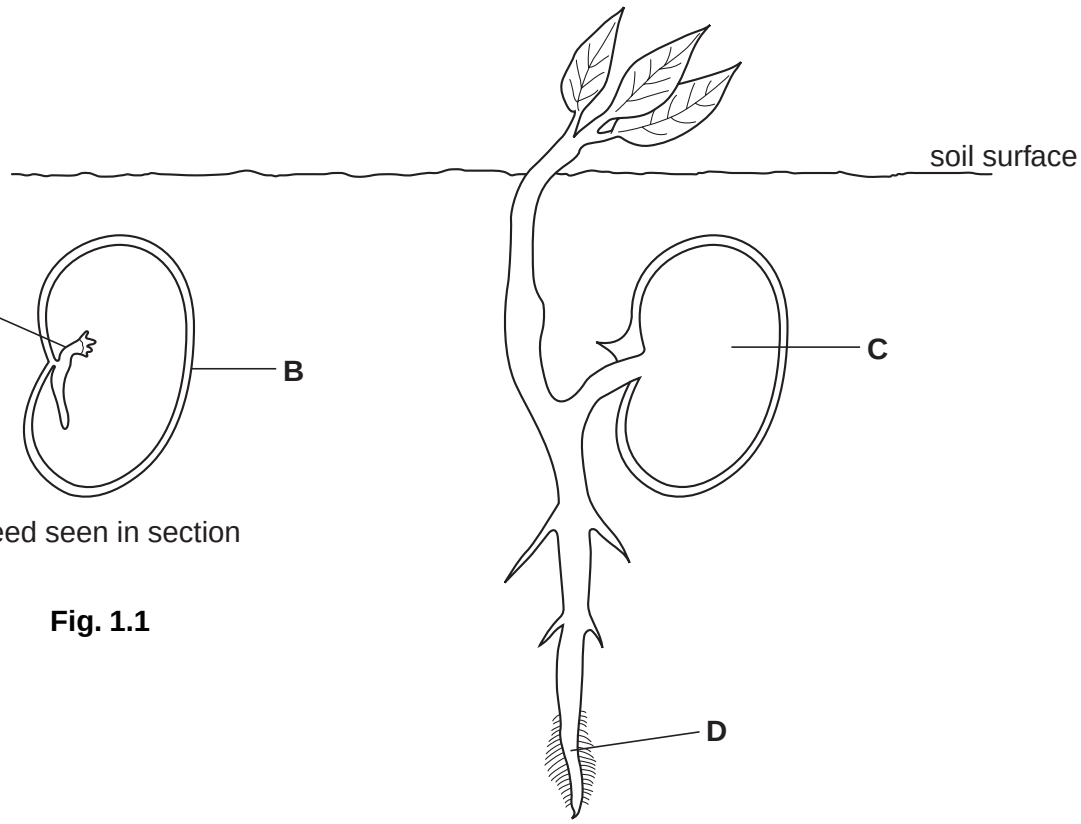

Fig. 1.2

(a) Identify structures **A** and **B**.

A .....

B ..... [2]

(b) **(i)** Suggest a food likely to be stored at **C**.

..... [1]

Explain how this food

(ii) is made available for the process of germination,

.....

.....

.....

(iii) travels to **D** in Fig. 1.2,

.....

.....

(iv) is used at **D**.

.....

..... [5]

(c) On Fig. 1.2, use labelled arrows to show where a **named** gas enters and leaves the seedling during daylight hours. [2]

[Total: 10]

2 Fig. 2.1 shows the liver receiving chemicals from and sending chemicals to some other organs.

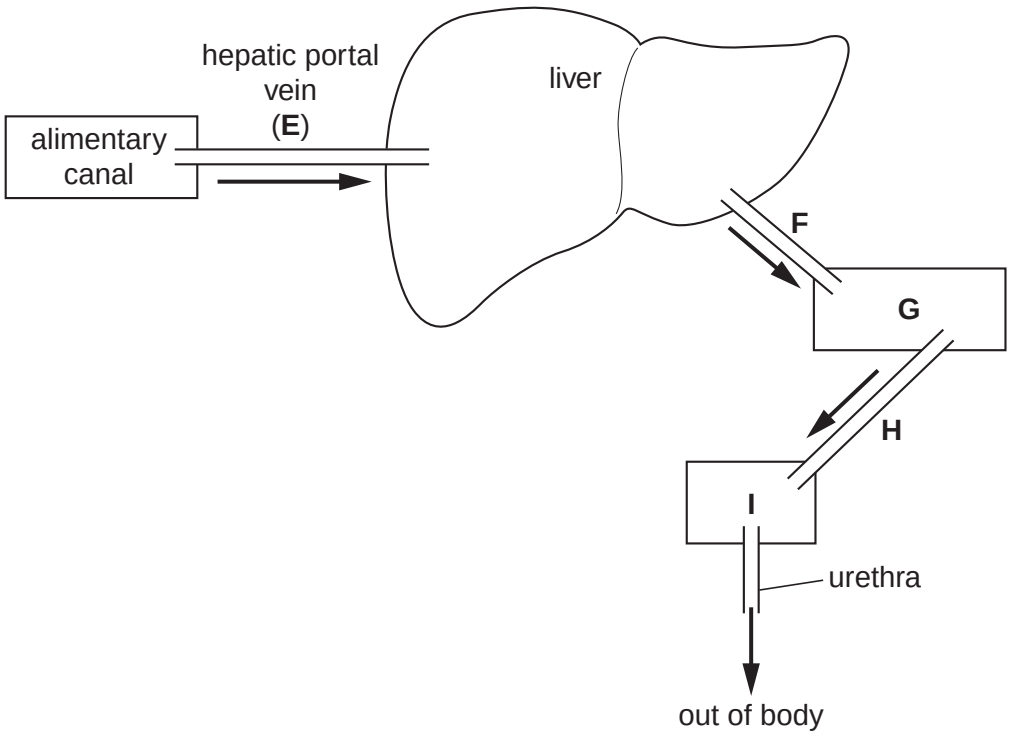

Fig. 2.1

(a) Identify organs **G** and **I**.

G .....

I ..... [2]

(b) Name the carbohydrate travelling in the hepatic portal vein (**E**), and explain how, on arrival in the liver, it is converted into a storage compound.

named carbohydrate .....

explanation .....

..... [4]

(c) Describe how the composition of the contents of **F** and **H** differ in a healthy person.

.....

.....

.....

..... [4]

[Total: 10]

3 Fig. 3.1 shows a section through a leaf.

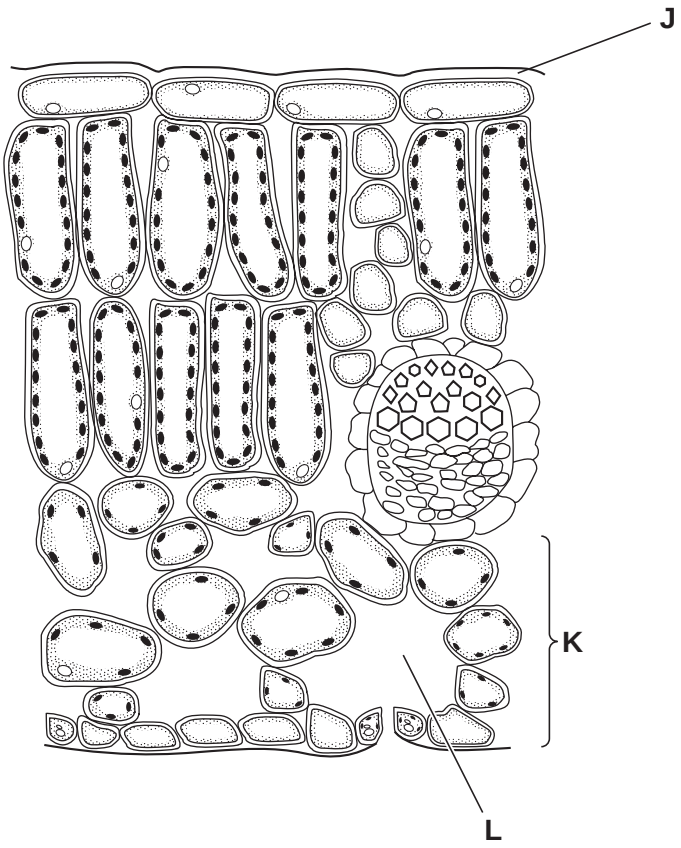

Fig. 3.1

(a) Identify structures **J** and **K**.

J .....

K ..... [2]

(b) **(i)** On Fig. 3.1, use arrows to show the pathway taken by water from its arrival in this part of the leaf until it is lost into the atmosphere. [3]

(ii) Place a large **X** so that its arms cross as closely as possible to the point at which evaporation of water is occurring. [1]

[Turn over

Fig. 3.2a shows the rates of transpiration for a particular species of plant at different air temperatures.

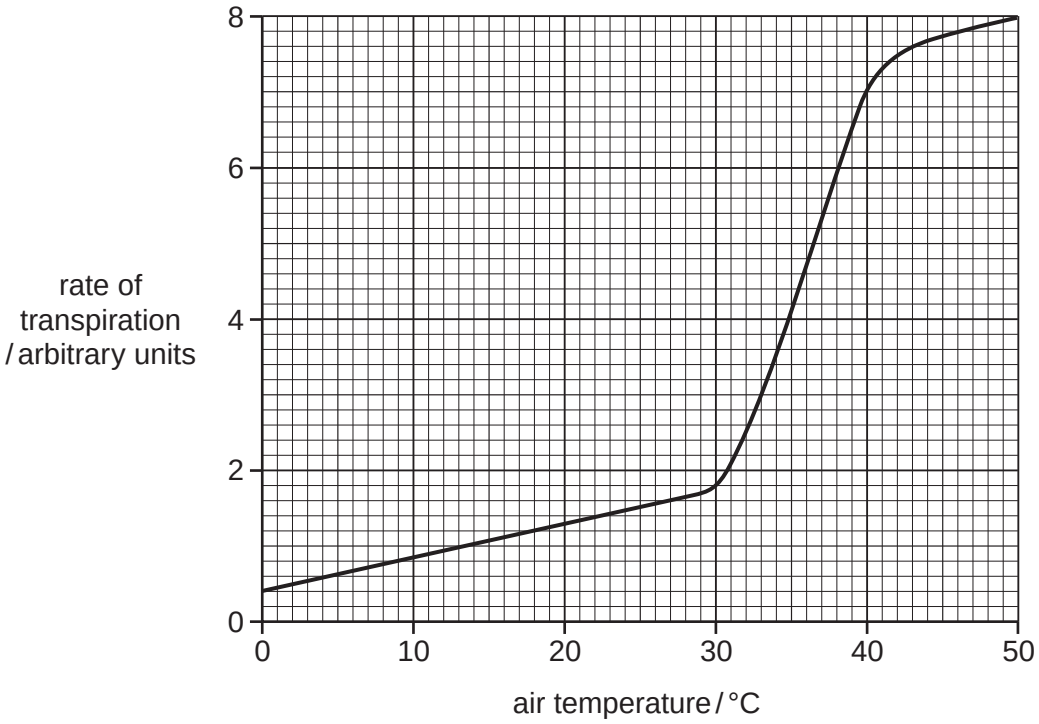

Fig. 3.2a

Fig. 3.2b shows the air temperatures and the temperatures inside the leaf at point **L** in Fig. 3.1 for the same plant during 24 hours.

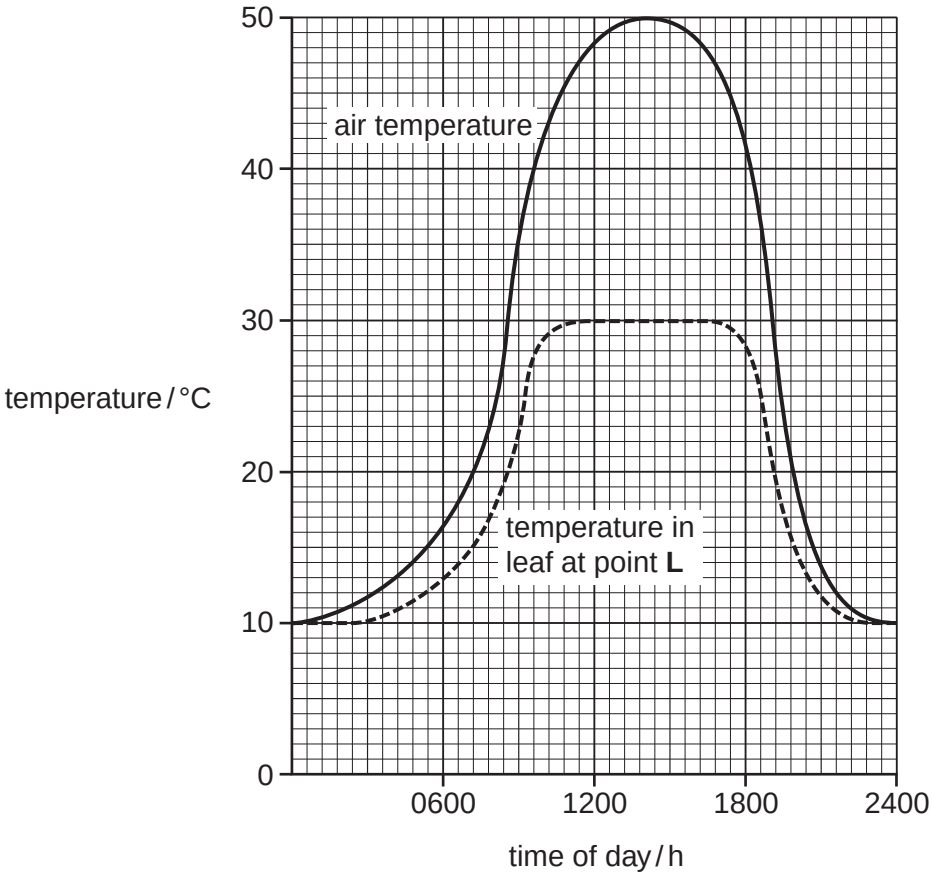

Fig. 3.2b

Fig. 3.2c shows stomata as they appear in this leaf at three different times during the day.

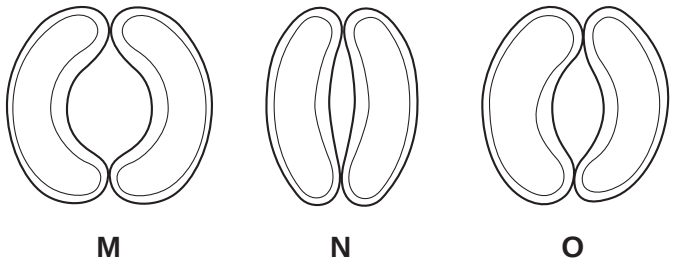

Fig. 3.2c

(c) Using information provided in Fig. 3.2a and Fig. 3.2b, state which of the stomatal pores, **M**, **N** and **O**, in Fig. 3.2c, shows their appearance at the following times of day.

(i) 03:00 .....

(ii) 19:30 .....

[2]

(d) Suggest why the temperature inside the leaf never rises above 30 °C, even though the air temperature rises much higher than this.

.....

.....

..... [2]

[Total: 10]

4 Fig. 4.1 shows human blood containing pathogenic (disease-causing) organisms.

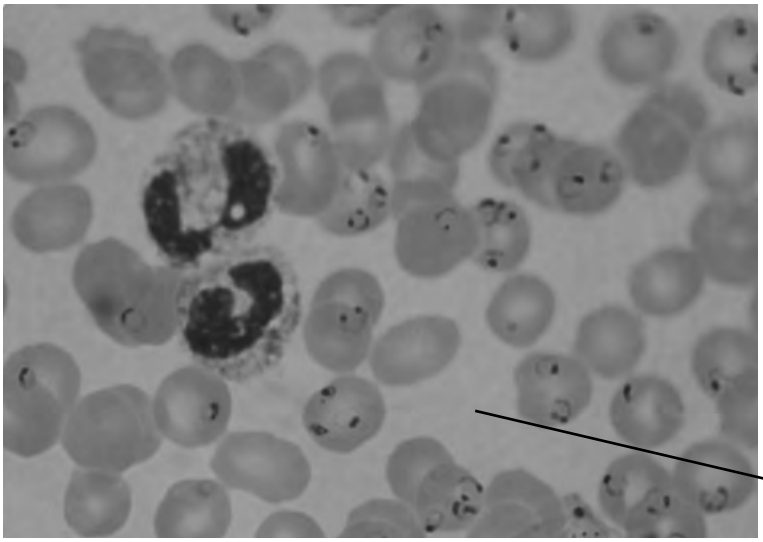

Fig. 4.1

(a) **(i)** Name the liquid labelled **Q** in Fig. 4.1. ..... [1]

(ii) Name two mineral ions which may be found in liquid **Q** and, for each ion, state its function in the body.

ion 1 ..... function .....

ion 2 ..... function .....

[3]

(b) On Fig. 4.1, label

(i) a white blood cell,

(ii) a red blood cell infected with the pathogenic organism.

[2]

(c) The pathogenic organisms were introduced into the blood by a mosquito while feeding. Suggest why the mosquito feeds from a capillary and not from an artery.

.....

.....

.....

..... [3]

[Total: 9]

5 Fig. 5.1 shows changes in the uterus during the menstrual cycle.

Fig. 5.1

(a) Identify **R**. ..... [1]

(b) State the days when each of the following processes are most likely to occur during the cycle.

(i) fertilisation .....

(ii) implantation .....

[2]

(c) Suggest and explain why blood must not pass directly from the mother to the fetus during pregnancy, even though it contains substances necessary for fetal development.

.....

.....

.....

..... [3]

Table 5.1 shows that temperature determines whether the eggs of a particular species of reptile hatch into a male or a female.

Table 5.1

	temperature / °C									
	29	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
% of females hatching	100	100	99	50	1	0	50	99	100	100
% males hatching	0	0	1	50	99	100	50	1	0	0

(d) (i) State the ranges of temperatures at which females are more likely than males to hatch from the eggs.

..... and ..... [2]

(ii) State three ways in which the production of a **male** human child differs from the production of the **male** form of this reptile.

1. .....

2. .....

3. ..... [3]

[Total: 11]

Section B

Answer **all** the questions including questions 6, 7 and 8 **Either** or 8 **Or**.

Write your answers on the separate answer paper provided.

6 **(a)** Fig. 6.1 shows the flow of energy through a part of the carbon cycle.

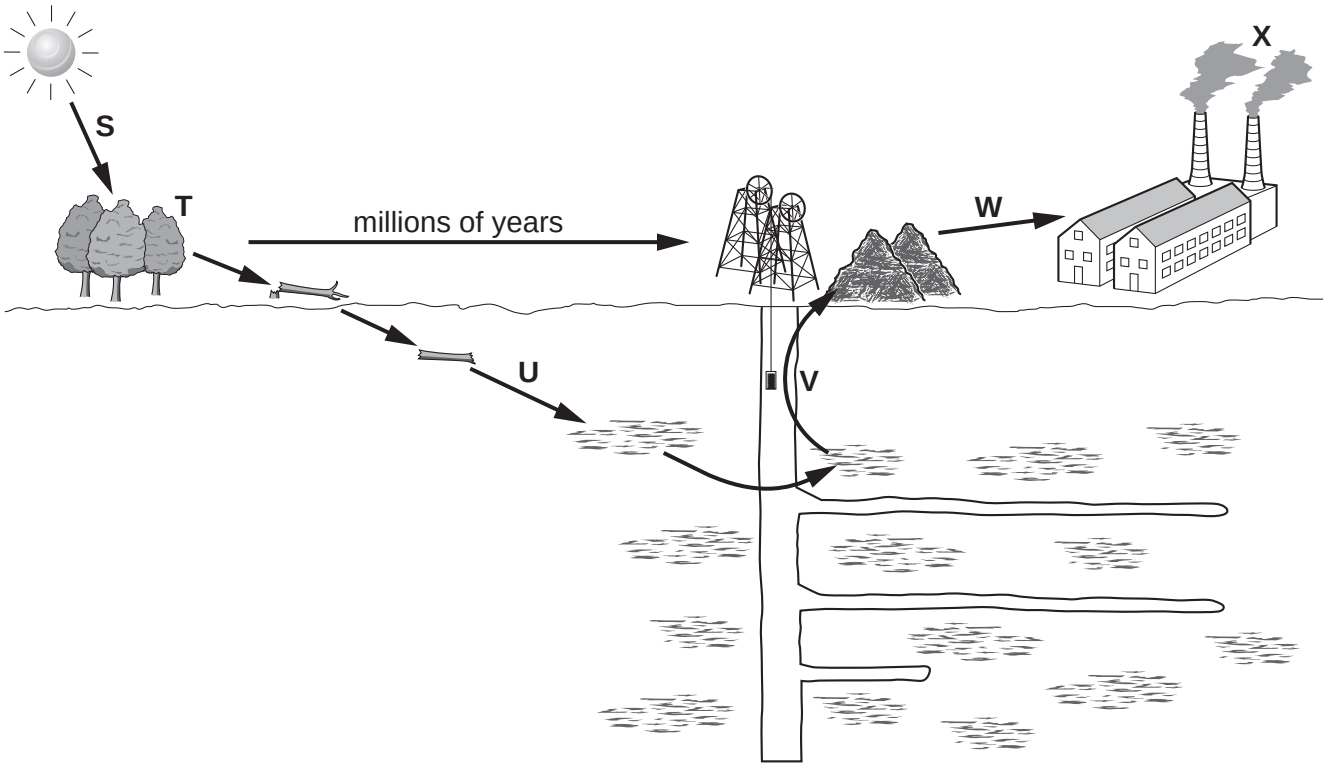

Fig. 6.1

Describe how energy flows through this part of the cycle by referring to what happens at each of the points **S** to **X**. [7]

(b) Describe the harm to the environment caused by human involvement in the cycle at **V**, **W** and **X**. [3]

[Total: 10]

7 **(a)** What is meant by the terms

(i) *discontinuous variation*,

(ii) *continuous variation*?

Describe **one** example of each type. [7]

(b) State the causes of

(i) sickle cell anaemia,

(ii) Down's syndrome. [3]

[Total: 10]

Question 8 is in the form of an **Either/Or** question. Answer only question 8 **Either** or question 8 **Or**.

8 **Either** **(a)** Define *respiration*. [3]

(b) State how aerobic and anaerobic respiration differ. [2]

(c) Describe a commercial use of anaerobic respiration. [5]

[Total: 10]

8 **Or** Describe the functions in a plant of

(a) cell walls, [5]

(b) cell membranes. [5]

[Total: 10]